

# **National Grid SA-COA** **PRODUCTION FILE**

**Contractor : ABB Contracting Co.**

**Project : SS 8709- 132/13.8kV in Alkharj City**

**Contract No : 11131113/00**

**Substation : 8709**

**Subject : 132Kv Busbar Protection Set-2 (+BBP2-2)  
Relay Panel-2**

**ABB**



POWER SYSTEMS NETWORK MANAGEMENT  
PROTECTION AND SUBSTATION AUTOMATION SYSTEMS  
WBS NO: S-13656

ABB AUTOMATION COMPANY LTD.  
414, AL-KHARJ ROAD  
SECOND INDUSTRIAL CITY  
RIYADH-11383 K.S.A

CONTRACTOR : ABB Contracting Company  
CLIENT : National Gridsa  
PROJECT : CONSTRUCTION OF NEW 132/13.8kV SS 8709 IN AL-KHARJ CITY  
SUBSTATION : S/S 8709  
CONTRACT NO. : 11131113/00  
TITLE : Assembly Drawing - +BBP2-2  
[132KV BUSBAR PROTECTION MAIN-2 BAY UNIT PANEL]

AS-BUILT BY \_\_\_\_\_ DATE \_\_\_\_\_ CONTRACT NO. 11131113/00 JOB ORDER NO. S-13656

01	13 49	FACTORY ASBUILT	DRAWN BY RIZ	CHECKED BY KVR
00	13 05	FOR APPROVAL	DATE STARTED 30.01.2013	DATE COMPLETED
REV. NO.	DATE	DESCRIPTION	OPRG. DEPT. CTPD	ENG. DEPT. AUT-PSAC

#### COVER SHEET

132KV BUSBAR PROTN.MAIN-2 BU PANEL +BBP2-2  
S/S 8709 - 132/13.8KV IN AL-KHARJ CITY  
RIYADH SAUDI ARABIA

الشركة الوطنية لنقل الكهرباء



نقل الكهرباء  
National Grid sa

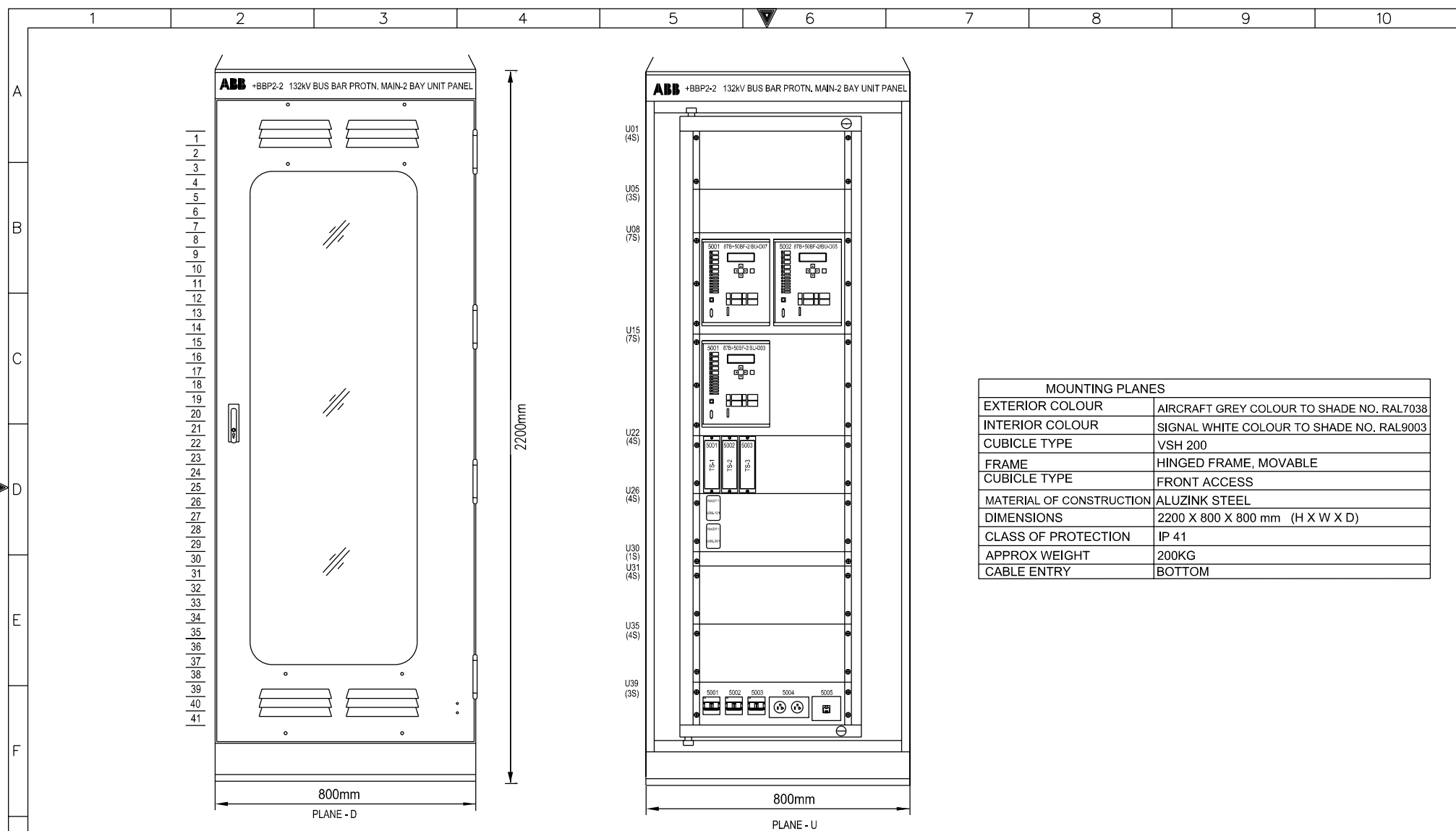
INDEX	PLANT NO.	DRAWING NUMBER	SHEET NO.	REV. NO.
-	C421	CD-323002	SHT 1 CONT.	01

NG/D2-D (2012/01)

DMS

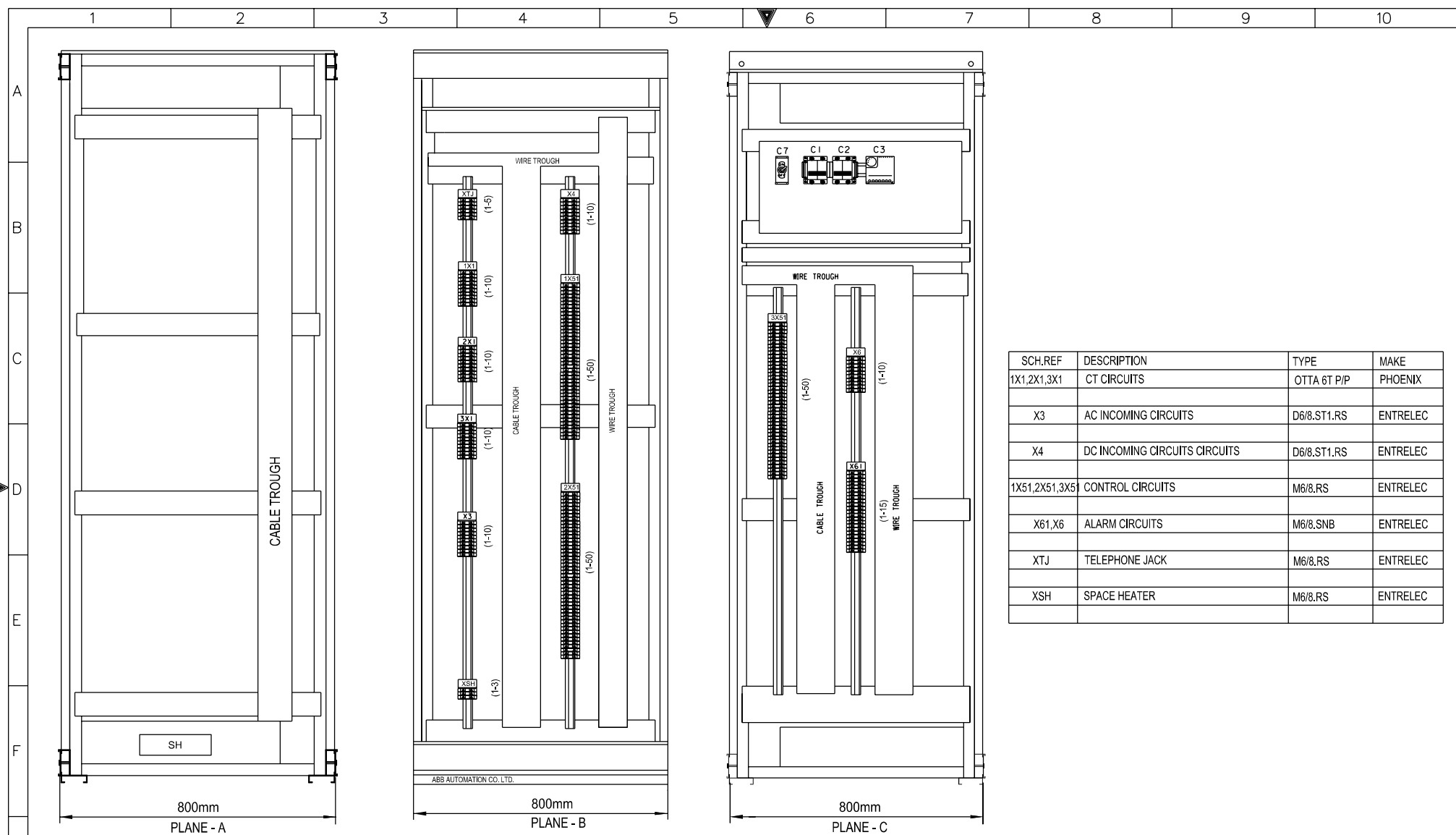
VECTOR

NGD200



MOUNTING PLANES	
EXTERIOR COLOUR	AIRCRAFT GREY COLOUR TO SHADE NO. RAL7038
INTERIOR COLOUR	SIGNAL WHITE COLOUR TO SHADE NO. RAL9003
CUBICLE TYPE	VSH 200
FRAME	HINGED FRAME, MOVABLE
CUBICLE TYPE	FRONT ACCESS
MATERIAL OF CONSTRUCTION	ALUZINK STEEL
DIMENSIONS	2200 X 800 X 800 mm (H X W X D)
CLASS OF PROTECTION	IP 41
APPROX WEIGHT	200KG
CABLE ENTRY	BOTTOM

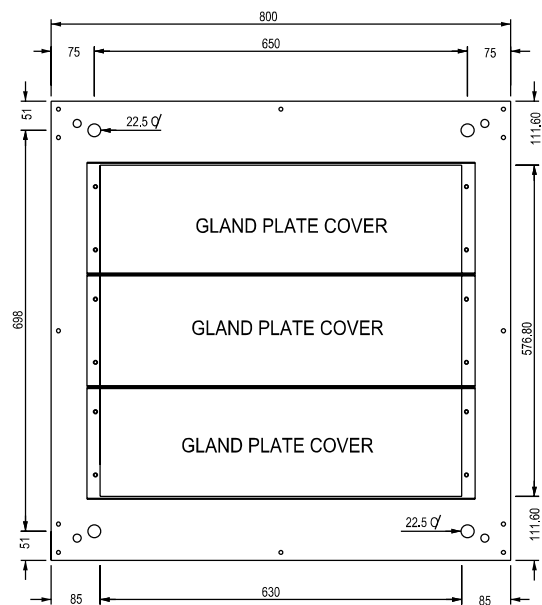
AS-BUILT BY _____ DATE _____		CONTRACT NO. 11131113/00	JOB ORDER NO. S-13656	ASSEMBLY DRAWING		الشركة الوطنية لنقل الكهرباء		نقل الكهرباء	
01	13 49	FACTORY ASBUILT		DRAWN BY RIZ	CHECKED BY KVR	132KV BUSBAR PROTN,MAIN-2 BU PANEL +BBP2-2		National Grid SA	
00	13 05	FOR APPROVAL		DATE STARTED 30.01.2013 DATE COMPLETED _____		S/S 8709 - 132/13.8KV IN AL-KHARJ CITY		INDEX PLANT NO. DRAWING NUMBER SHEET NO. REV. NO.	
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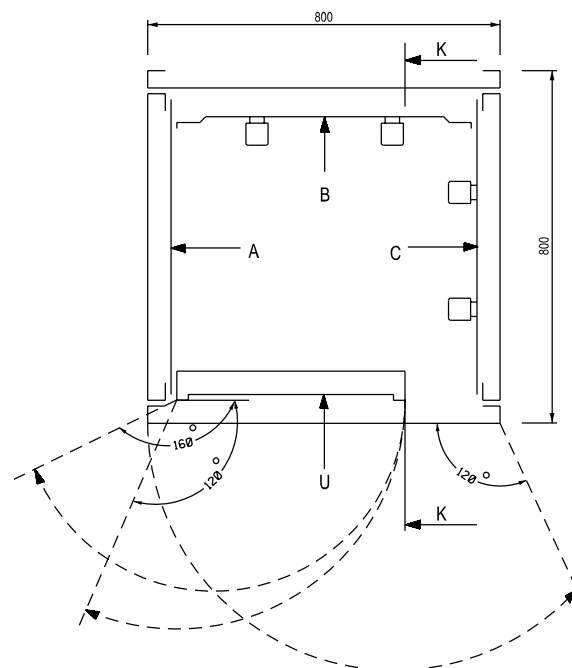
SCH.REF	DESCRIPTION	TYPE	MAKE
1X1,2X1,3X1	CT CIRCUITS	OTTA 6T P/P	PHOENIX
X3	AC INCOMING CIRCUITS	D6/8.ST1.RS	ENTRELEC
X4	DC INCOMING CIRCUITS	D6/8.ST1.RS	ENTRELEC
1X51,2X51,3X51	CONTROL CIRCUITS	M6/8.RS	ENTRELEC
X61,X6	ALARM CIRCUITS	M6/8.SNB	ENTRELEC
XTJ	TELEPHONE JACK	M6/8.RS	ENTRELEC
XSH	SPACE HEATER	M6/8.RS	ENTRELEC

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00	13 05	FOR APPROVAL	DATE STARTED 30.01.2013	DATE COMPLETED	S/S 8709 - 132/13.8KV IN AL-KHARJ CITY			-	C421	CD-323002	SHT  CONT	
REV. NO.	DATE	DESCRIPTION	OPRG. DEPT. CTPD	ENG. DEPT. AUT-PSAC	RIYADH SAUDI ARABIA						G02 G03	01

BASE PLATE/  
FOUNDATION



PLAN



AS-BUILT BY \_\_\_\_\_ DATE \_\_\_\_\_ CONTRACT NO. 11131113/00 JOB ORDER NO. S-13656

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ASSEMBLY DRAWING

132KV BUSBAR PROTN.MAIN-2 BU PANEL +BBP2-2  
S/S 8709 - 132/13.8KV IN AL-KHARJ CITY  
RIYADH SAUDI ARABIA

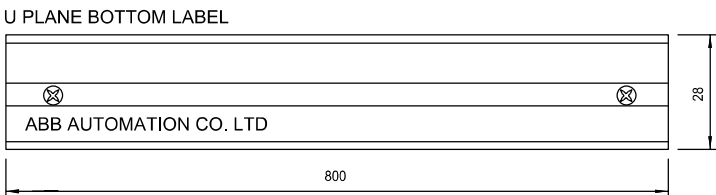
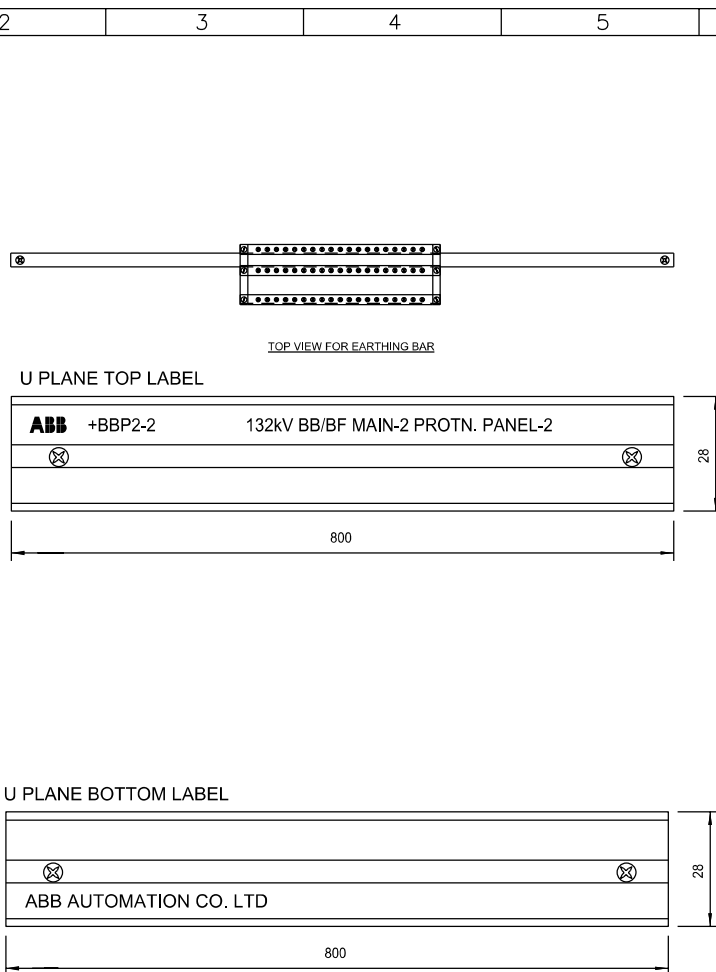
الشركة الوطنية لنقل الكهرباء



INDEX	PLANT NO.	DRAWING NUMBER	SHEET NO.	REV. NO.
-	C421	CD-323002	G03   G04	01

NG/D2-D (2012/01)  
DMS VECTOR NGD200

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MANUFACTURING LABEL

**ABB Automation Co.Ltd.**

PROJECT	:	National Grid SA S/S 8709
ORDER REFERENCE	:	2875 RF S13656
YEAR OF MANUFACTURE:	:	2013
PANEL NO.	:	+BBP 2.2
DRAWING NO.	:	S13656-CD-323003

**MADE IN THE KINGDOM OF SAUDI ARABIA**

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AS-BUILT BY _____		DATE _____	CONTRACT NO. 11131113/00	JOB ORDER NO. S-13656	ASSEMBLY DRAWING		<div><div>نقل الكهرباء</div><div><div><div></div><div>الشركة الوطنية لنقل الكهرباء</div><div>National Grid SA</div></div></div></div>				
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REV. NO.	DATE	DESCRIPTION		OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC		RIYADH SAUDI ARABIA	-	C421	CD-323002	G04 L00	01



POWER SYSTEMS NETWORK MANAGEMENT  
PROTECTION AND SUBSTATION AUTOMATION SYSTEMS  
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SUBSTATION : S/S 8709  
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TITLE : LIST OF APPARATUS – +BBP2-2  
[132KV BUSBAR PROTECTION MAIN-2 BAY UNIT PANEL]

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RIYADH SAUDI ARABIA

الشركة الوطنية لنقل الكهرباء



نقل الكهرباء  
National Grid sa

INDEX	PLANT NO.	DRAWING NUMBER	SHEET NO.	REV. NO.
-	C421	CD-323002	SHT   CONT. L00   L01	01

DMS

VECTOR

NGD200

	1	2	3	4	5	6	7	8	9	10
A	SR. NO.	GA. REF.	SCH. REF.	DESCRIPTION		SHT.	QTY.	TYPE	MAKE	ORDERING INFORMATION
	1	U08.5001	87B+50BF-2/BU-D07	RELAY CUBICLE- +BBP2-2 FOR 132KV BB/BF MAIN-2 ACCOMODATING THE FOLLOWING			3	VSH 200	ABB	
		U08.5002	87B+50BF-2/BU-D05	BAY UNIT FOR NUMERICAL BUSBAR PROTECTION WITH FOLLOWING		293,294		7SS523	SIEMENS	7SS5231-5CA01+1AA1
		U15.5001	87B+50BF-2/BU-D03	HIGH TROUGH-FAULT STABILITY EVEN IN CASE OF CT SATURATION.		295,296				
				NEUTRAL CURRENT CRITERION INSTANTANEOUS VALUES FOR FAULT RECORDING.		297,298				
				DISTURBANCE FREE AND FAST DATA TRANSFER TO & FROM CENTRAL UNIT						
				PHASE SEGRAGATED MEASUREMENT						
				REDUCE CT PERFORMANCE REQUIREMENTS						
				BUILT IN HUMAN MACHINE INTERFACE						
				BUILT IN BREAKER FAILURE FUNCTION.						
B				END FAULT PROTECTION FUNCTION						
				DISTURBANCE RECORDER						
				BINARY OUTPUT : 20						
				BINARY OUTPUT : 6+2-WD						
				FULLY NUMERICAL SIGNAL PROCESSING						
				RATED CURRENT : 1A						
				AUX. VOLTAGE : 60-250V DC						
				RATED FREQUENCY : 60HZ						
C	2	U22.5001	TS-1	TEST SWITCH FOR 87B+50BF-2/BU-D07 RELAY		293	3	MMLG02	ALSTOM	MMLG02 R1AA 0001D
		U22.5002	TS-2	TEST SWITCH FOR 87B+50BF-2/BU-D05 RELAY		295				
		U22.5003	TS-3	TEST SWITCH FOR 87B+50BF-2/BU-D03 RELAY		297				
	3	U26.101	74BF-2/D07	DUAL TARGET RELAY FOR 87B+50BF-2/D07 AND 87B+50BF-2/D05 DC SUPERVISION		232	1	RXSF 1	ABB	RK 271 019-AN
			/74BF-2/D05	AUXILIARY VOLTAGE : 110-125V DC		235				
				CONTACT DATA : 1NO + 2NC						
				FLAG : SELF RESET,REVERSE						
D	4	U26.301	74BF-2/D03	DUAL TARGET RELAY FOR 87B+50BF-2/D03 DC SUPERVISION		238	1	RXSF 1	ABB	RK 271 019-AN
			/SPARE	AUXILIARY VOLTAGE : 110-125V DC						
				CONTACT DATA : 1NO + 2NC						
				FLAG : SELF RESET,REVERSE						
E										
F										

AS-BUILT BY _____ DATE _____		CONTRACT NO. 11131113/00		JOB ORDER NO. S-13656		LIST OF APPARATUS		الشركة الوطنية لنقل الكهرباء نقل الكهرباء National Grid sa	
01	13 49	FACTORY ASBUILT		DRAWN BY RIZ CHECKED BY KVR		132KV BUSBAR PROTN.MAIN-2 BU PANEL +BBP2-2		INDEX PLANT NO. DRAWING NUMBER SHEET NO. REV. NO. - C421 CD-323002 L01 L02 01	
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REV. NO.	DATE	DESCRIPTION		OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC		RIYADH SAUDI ARABIA			

NG/D2-D (2012/01)	
DMS	VECTOR
NGD200	

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LABEL REF.	LABEL ENGRAVING	MATERIALS	ENGRAVING	LABEL SIZE	LETTER SIZE
U08.5001	U08.5001 87B+50BF-2/BU-D07	TRAFOLITE	BLACK LETTERS ON WHITE BACKGROUND	50X15mm	4mm
U08.5002	U08.5002 87B+50BF-2/BU-D05	TRAFOLITE	BLACK LETTERS ON WHITE BACKGROUND	50X15mm	4mm
U15.5001	U15.5001 87B+50BF-2/BU-D03	TRAFOLITE	BLACK LETTERS ON WHITE BACKGROUND	50X15mm	4mm
U22.5001	U22.5001 IS-1	ALUMINUM PAPER FOIL	BLACK LETTERS	50X10mm	3mm
U22.5002	U22.5002 IS-2	ALUMINUM PAPER FOIL	BLACK LETTERS	50X10mm	3mm
U22.5003	U22.5003 IS-3	ALUMINUM PAPER FOIL	BLACK LETTERS	50X10mm	3mm
U26.101	U26.101 74BF-2/D07	ALUMINUM PAPER FOIL	BLACK LETTERS	50X10mm	3mm
U26.301	U26.301 74BF-2/D03	ALUMINUM PAPER FOIL	BLACK LETTERS	50X10mm	3mm
U39.5001	U39.5001 DC SUPPLY MCB FOR D07	TRAFOLITE	BLACK LETTERS ON WHITE BACKGROUND	50X15mm	4mm
U39.5002	U39.5002 DC SUPPLY MCB FOR D05	TRAFOLITE	BLACK LETTERS ON WHITE BACKGROUND	50X15mm	4mm
U39.5003	U39.5003 DC SUPPLY MCB FOR D03	TRAFOLITE	BLACK LETTERS ON WHITE BACKGROUND	50X15mm	4mm
U39.5004	U39.5004 C01-127V,C02-220V	TRAFOLITE	BLACK LETTERS ON WHITE BACKGROUND	50X15mm	4mm
U39.5005	U39.5005 TJ	TRAFOLITE	BLACK LETTERS ON WHITE BACKGROUND	50X15mm	4mm

AS-BUILT BY _____ DATE _____		CONTRACT NO. 11131113/00	JOB ORDER NO. S-13656	LIST OF APPARATUS		الشركة الوطنية لنقل الكهرباء		 <b>نقل الكهرباء</b> National Grid sa	
01	13 49	FACTORY ASBUILT		DRAWN BY RIZ CHECKED BY KVR		132KV BUSBAR PROTN.MAIN-2 BU PANEL +BBP2-2		INDEX	PLANT NO.
00	13 05	FOR APPROVAL		DATE STARTED 30.01.2013 DATE COMPLETED _____		S/S 8709 - 132/13.8KV IN AL-KHARJ CITY		DRAWING NUMBER	SHEET NO.
REV. NO.	DATE	DESCRIPTION		OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC		RIYADH SAUDI ARABIA		CD-323002	SHT   CONT. L04   L05
									REV. NO.
									01

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G	<table><tr><td colspan="3">AS-BUILT BY _____ DATE _____</td><td colspan="2">CONTRACT NO. 11131113/00</td><td colspan="2">JOB ORDER NO. S-13656</td><td colspan="3">LIST OF APPARATUS</td><td colspan="2"><div>الشركة الوطنية لنقل الكهرباء</div><div> نقل الكهرباء National Grid sa</div></td></tr><tr><td>01</td><td>13 49</td><td colspan="3">FACTORY ASBUILT</td><td colspan="2">DRAWN BY RIZ CHECKED BY KVR</td><td colspan="3">132KV BUSBAR PROTN.MAIN-2 BU PANEL +BBP2-2</td><td>INDEX</td><td>PLANT NO.</td><td>DRAWING NUMBER</td><td>SHEET NO.</td><td>REV. NO.</td></tr><tr><td>00</td><td>13 05</td><td colspan="3">FOR APPROVAL</td><td colspan="2">DATE STARTED 30.01.2013 DATE COMPLETED</td><td colspan="3">S/S 8709 - 132/13.8KV IN AL-KHARJ CITY</td><td></td><td></td><td></td><td>SHT  CONT.</td><td></td></tr><tr><td>REV. NO.</td><td>DATE</td><td colspan="3">DESCRIPTION</td><td colspan="2">OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC</td><td colspan="3">RIYADH SAUDI ARABIA</td><td>-</td><td>C421</td><td>CD-323002</td><td>L05 NIL</td><td>01</td></tr></table>										AS-BUILT BY _____ DATE _____			CONTRACT NO. 11131113/00		JOB ORDER NO. S-13656		LIST OF APPARATUS			<div>الشركة الوطنية لنقل الكهرباء</div> <div> نقل الكهرباء National Grid sa</div>		01	13 49	FACTORY ASBUILT			DRAWN BY RIZ CHECKED BY KVR		132KV BUSBAR PROTN.MAIN-2 BU PANEL +BBP2-2			INDEX	PLANT NO.	DRAWING NUMBER	SHEET NO.	REV. NO.	00	13 05	FOR APPROVAL			DATE STARTED 30.01.2013 DATE COMPLETED		S/S 8709 - 132/13.8KV IN AL-KHARJ CITY						SHT  CONT.		REV. NO.	DATE	DESCRIPTION			OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC		RIYADH SAUDI ARABIA			-	C421	CD-323002	L05 NIL	01
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WBS NO: S-13656

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RIYADH-11383 K.S.A

CONTRACTOR : ABB Contracting Company  
CLIENT : National Gridsa  
PROJECT : CONSTRUCTION OF NEW 132/13.8kV SS 8709 IN AL-KHARJ CITY  
SUBSTATION : S/S 8709  
CONTRACT NO. : 11131113/00  
TITLE : SCHEMATICS DRAWINGS - +BBP2-2  
[132KV BUSBAR PROTECTION MAIN-2 BAY UNIT PANEL]

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INDEX	PLANT NO.	DRAWING NUMBER	SHEET NO.	REV. NO.
-	C421	CD-323003	SHT 001	01

NG/D2-D (2012/01)

DMS VECTOR NGD200

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LIGHTING, HEATER & SOCKET ALARM CKT.	212	X	X		DC SUPPLY DISTRIBUTION	216	X	X		CURRENT TRANSFORMER INPUTS -87B+50BF-2/BU-D07	221	X	X		CURRENT TRANSFORMER INPUTS -87B+50BF-2/BU-D05	222	X	X		CURRENT TRANSFORMER INPUTS -87B+50BF-2/BU-D03	223	X	X		87B+50BF-2/BU-D07 PROTN.RELAY-BINARY INPUTS	231	X	X		87B+50BF-2/BU-D07 PROTN.RELAY-BINARY INPUTS	232	X	X		CBF + BUSBAR PROTN.-2 TRIP RELAY CIRCUIT -D07	233	X	X		87B+50BF-2/BU-D05 PROTN.RELAY-BINARY INPUTS	234	X	X		87B+50BF-2/BU-D05 PROTN.RELAY-BINARY INPUTS	235	X	X		CBF + BUSBAR PROTN.-2 TRIP RELAY CIRCUIT -D05	236	X	X		87B+50BF-2/BU-D03 PROTN.RELAY-BINARY INPUTS	237	X	X		87B+50BF-2/BU-D03 PROTN.RELAY-BINARY INPUTS	238	X	X		CBF + BUSBAR PROTN.-2 TRIP RELAY CIRCUIT -D03	239	X	X												<table><thead><tr><th>CONTENTS</th><th>ABB SHT.NO.</th><th>REV.00</th><th>REV.01</th><th>REV.02</th></tr></thead><tbody><tr><td>COMMON ALARM CIRCUITS</td><td>292</td><td>X</td><td>X</td><td></td></tr><tr><td>BLOCK REFERENCE 87B+50BF-2/BU-D07</td><td>293</td><td>X</td><td>X</td><td></td></tr><tr><td>BLOCK REFERENCE 87B+50BF-2/BU-D07</td><td>294</td><td>X</td><td>X</td><td></td></tr><tr><td>BLOCK REFERENCE 87B+50BF-2/BU-D05</td><td>295</td><td>X</td><td>X</td><td></td></tr><tr><td>BLOCK REFERENCE 87B+50BF-2/BU-D05</td><td>296</td><td>X</td><td>X</td><td></td></tr><tr><td>BLOCK REFERENCE 87B+50BF-2/BU-D03</td><td>297</td><td>X</td><td>X</td><td></td></tr><tr><td>BLOCK REFERENCE 87B+50BF-2/BU-D03</td><td>298</td><td>X</td><td>X</td><td></td></tr><tr><td>TERMINAL BLOCKS REFERENCE</td><td>301</td><td>X</td><td>X</td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr></tbody></table>					CONTENTS	ABB SHT.NO.	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SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	FUSE / LINK		WATTMETER		ELEMENT WITH NEGATED INHIBITING INPUT
	FUSE WITH THE SUPPLY SIDE INDICATED		VARMETER		ELEMENT WITH INPUT WHICH DOES NOT CARRY ANY LOGIC INFORMATION
	SINGLE-PHASE TRANSFORMER WITH TWO SEPARATE WINDINGS (TWO ALTERNATIVE FORMS)		POWER FACTOR METER		ELEMENT WITH POSTPONED OUTPUT
	SINGLE-PHASE TRANSFORMER WITH THREE SEPARATE WINDINGS (TWO ALTERNATIVE FORMS)		POSITION INDICATOR		AND-ELEMENT WITH TWO INPUTS
	SINGLE-PHASE TRANSFORMER WITH FERRO MAGNETIC CORE		SYNCHROSCOPE		OR-ELEMENT WITH TWO INPUTS
	SINGLE-PHASE VOLTAGE TRANSFORMER (MULTI-LINE AND SINGLE-LINE REPRESENTATION)		RECORDING VOLTMETER		LOGIC THRESHOLD ELEMENT WITH FOUR INPUTS AND THRESHOLD VALUE 2
	SINGLE-PHASE VOLTAGE TRANSFORMER WITH TWO SECONDARY WINDINGS (MULTI-LINE AND SINGLE-LINE REPRESENTATION)		RECORDING WATTMETER		ELEMENT WITH THREE INPUTS FOR "2 AND ONLY 2"
	CURRENT TRANSFORMER (MULTI-LINE AND SINGLE-LINE REPRESENTATION)		HOUR METER		EXCLUSIVE OR-ELEMENT WITH THREE INPUTS
	CURRENT TRANSFORMER WITH TWO CORES (MULTI-LINE AND SINGLE-LINE REPRESENTATION)		WATT-HOUR METER		LOGIC IDENTITY ELEMENT WITH THREE INPUTS
	CURRENT TRANSFORMER WITH TWO SECONDARY WINDINGS ON ONE CORE (MULTI-LINE AND SINGLE-LINE REPRESENTATION)		WATT-HOUR METER FOR ENERGY FROM A BUSBAR SYSTEM		MAJORITY ELEMENT WITH THREE INPUTS
	FILTER		ELEMENT WITH STATIC INPUT		NEGATOR
	HIGH-PASS FILTER		ELEMENT WITH STATIC NEGATED INPUT		NAND ELEMENT WITH TWO INPUTS
	BAND-PASS FILTER		ELEMENT WITH STATIC NEGATED OUTPUT		NOR ELEMENT WITH TWO INPUTS
	VOLTMETER		ELEMENT WITH DYNAMIC INPUT		BISTABLE ELEMENT
	AMMETER		ELEMENT WITH DYNAMIC NEGATED INPUT		
			ELEMENT WITH INHIBITING INPUT		

AS-BUILT BY _____ DATE _____			CONTRACT NO. 11131113/00		JOB ORDER NO. S-13656		GRAPHICAL SYMBOLS FOR DIAGRAMS				الشركة الوطنية لنقل الكهرباء National Grid sa			
01	13 49	FACTORY ASBUILT	DRAWN BY RIZ		CHECKED BY KVR		132KV BUSBAR PROTN.MAIN-2 BU PANEL +BBP2-2				INDEX	PLANT NO.	DRAWING NUMBER	SHEET NO.
00	13 05	FOR APPROVAL	DATE STARTED 30.01.2013		DATE COMPLETED		S/S 8709 - 132/13.8KV IN AL-KHARJ CITY							SHT   CONT.
REV. NO.	DATE	DESCRIPTION	OPRG. DEPT. CTPD		ENG. DEPT. AUT-PSAC		RIYADH SAUDI ARABIA				-	C421	CD-323003	012   013



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## LEGENDS

±R1	DC SUPPLY – MAIN PROTECTION
±R2	DC SUPPLY – SECONDARY PROTECTION
±R3	DC SUPPLY – BACK UP PROTECTION
±IT	DC SUPPLY – INTER TRIP
FL	DC SUPPLY – FLASHING CIRCUIT
BB RS±	DC SUPPLY – BUS BAR – PROTECTION RESET
BB CBF±/CBF±	DC SUPPLY – CBF PROTECTION
R	RESET BUS – ALARM SYSTEM
CR	CONTROL ROOM
ECC	ENERGY CONTROL CENTRE
LOCAL	THE LOCATION OF CONTROLLED DEVICE
REMOTE	ANY OTHER LOCATION NOT LOCAL
ON	CB NORMALLY OPEN AUXILIARY CONTACT
OFF	CB NORMALLY CLOSED AUXILIARY CONTACT
A	COMMON
T	TEST POSITION
S	SERVICE POSITION
CS	CLOSE IN SERVICE POSITION
CT	CLOSE IN TEST POSITION
LS	LOCAL SERVICE
LT	LOCAL TEST
LC	LOCAL CLOSE
LO	LOCAL OPEN
RO	REMOTE OPEN
OP	OPERATE
RE	RESET

## NOTES

### LABELS

WHITE LABEL WITH BLACK LETTERING WILL BE PROVIDED FOR ALL MOUNTED APPARATUS EQUIPMENT IDENTIFICATION AND FUNCTION REFERENCE LABEL WILL BE PROVIDED FOR FRONT MOUNTED EQUIPMENTS OF THE PANEL AND EQUIPMENT IDENTIFICATION LABEL WILL BE PROVIDED FOR INTERNALLY MOUNTED EQUIPMENTS

### WIRING

PVC INSULATED 600V GRADE  
 2.5 SQ.mm. YELLOW COLOURED FOR CT CIRCUITS  
 2.5 SQ.mm. RE COLOURED FOR VT CIRCUITS  
 1.5 SQ.mm. GREY COLOURED FOR DC SUPPLY, SCADA AND CONTROL CIRCUITS  
 2.5 SQ.mm. BLACK COLOURED FOR AVC AND AC CIRCUITS  
 2.5 SQ.mm. YELLOW/GREEN COLOURED FOR EARTHING CONNECTIONS  
 FOLLOWING MARKERS SHALL BE PROVIDED ON FOLLOWING WIRES:  
 + SIGN FOR DC + WIRE  
 – SIGN FOR DC – WIRE

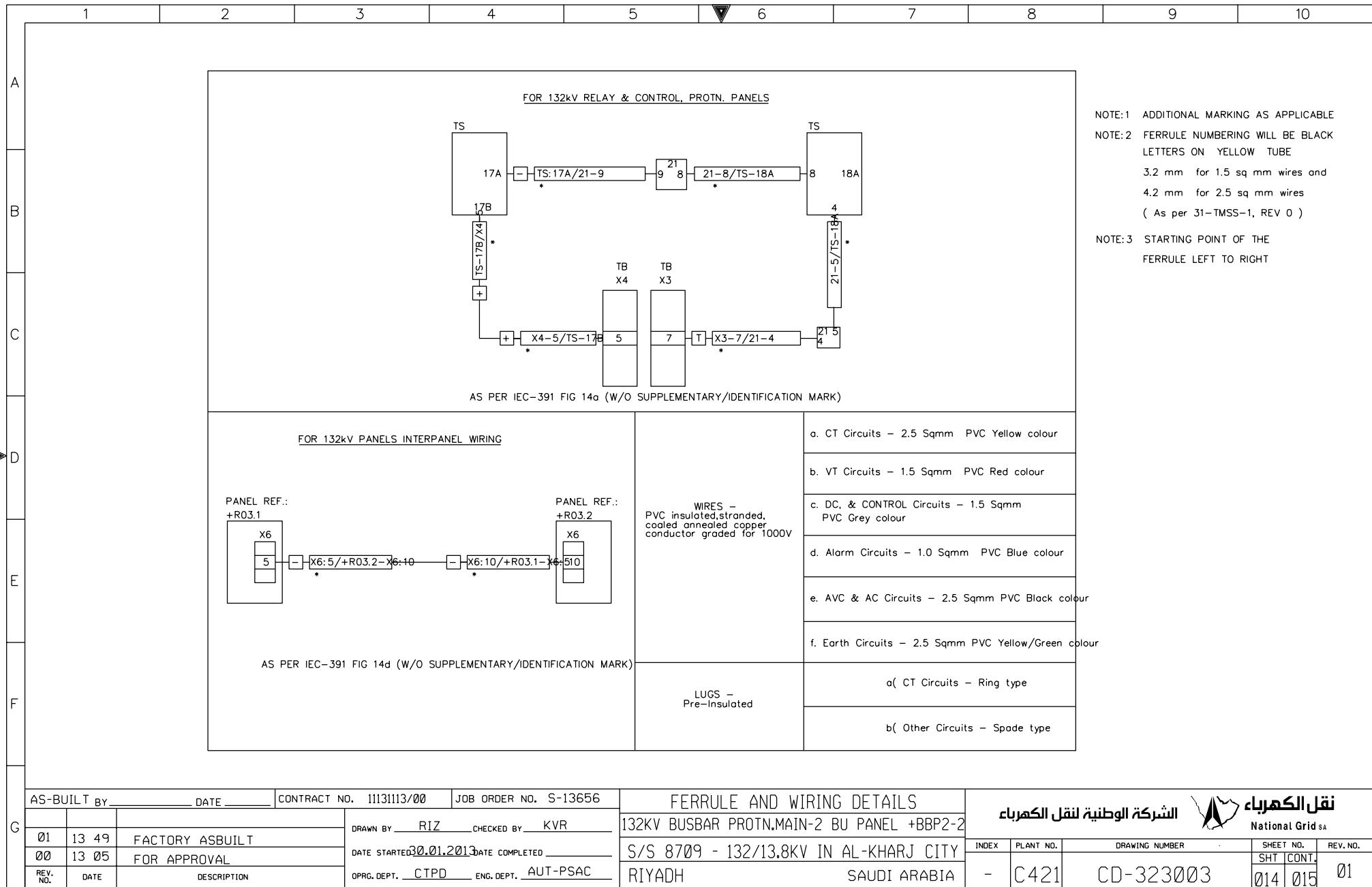
### LUGS

A. CT CIRCUITS– RING TYPE  
 B. OTHER CIRCUITS – SPADE TYPE

### FERULLING

YELLOW TUBE 3.2 mm FOR 1.5SQ mm WIRES AND 4.2 FOR 2.5 SQ mm WIRES  
 ( AS PER 31 – TMSS–1, RE.0 )

AS-BUILT BY _____ DATE _____			CONTRACT NO. 11131113/00		JOB ORDER NO. S-13656		COMMON LEGEND				الشركة الوطنية لنقل الكهرباء National Grid sa			
01	13 49	FACTORY ASBUILT	DRAWN BY RIZ		CHECKED BY KVR		132KV BUSBAR PROTN.MAIN-2 BU PANEL +BBP2-2				INDEX	PLANT NO.	DRAWING NUMBER	SHEET NO.
00	13 05	FOR APPROVAL	DATE STARTED 30.01.2013		DATE COMPLETED		S/S 8709 - 132/13.8KV IN AL-KHARJ CITY				-	C421	CD-323003	SHT   CONT.
REV. NO.	DATE	DESCRIPTION	OPRG. DEPT. CTPD		ENG. DEPT. AUT-PSAC		RIYADH SAUDI ARABIA							013   014



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REV. NO.	DATE	DESCRIPTION	OPRG. DEPT. CTPD		ENG. DEPT. AUT-PSAC		RIYADH SAUDI ARABIA			CD-323003	SHT  CONT.
										016   051	01



PROTECTION & SUBSTATION  
AUTOMATION

SCHEMATICS DWG.NO

PANEL DESCRIPTION

PANEL  
REFERENCE

SS 8709 13.8KV RELAY PANELS

CD-322952 13.8KV Capacitor Bank-1 Protection Panel

+CBP-1

CD-322954 13.8KV Capacitor Bank-2 Protection Panel

+CBP-2

CD-322956 13.8KV Capacitor Bank-2 Protection Panel

+CBP-3

CD-322958 13.8 KV ACCS PANEL

+ACCS

CD-322962 13.8KV ACSE PANEL

+ACSE

CD-322968 13.8KV Under Voltage Load Shedding Panel

+UVLS

CD-322964 13.8KV Under Frequency Load Shedding Panel-1

+UFLS01

CD-322966 13.8KV Under Frequency Load Shedding Panel-2

+UFLS02

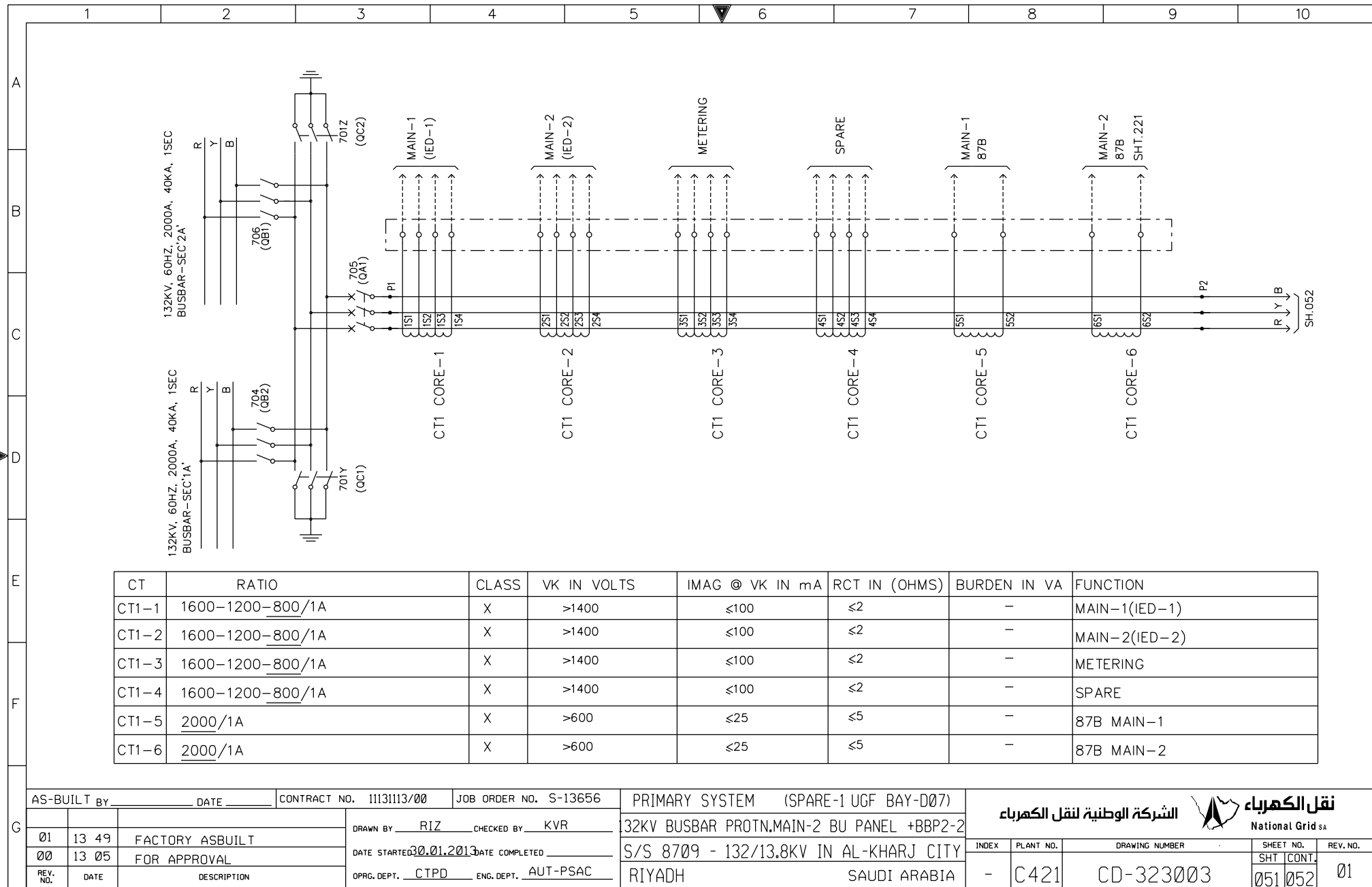
NG/D2-D (2012/01)

DMS

VECTOR

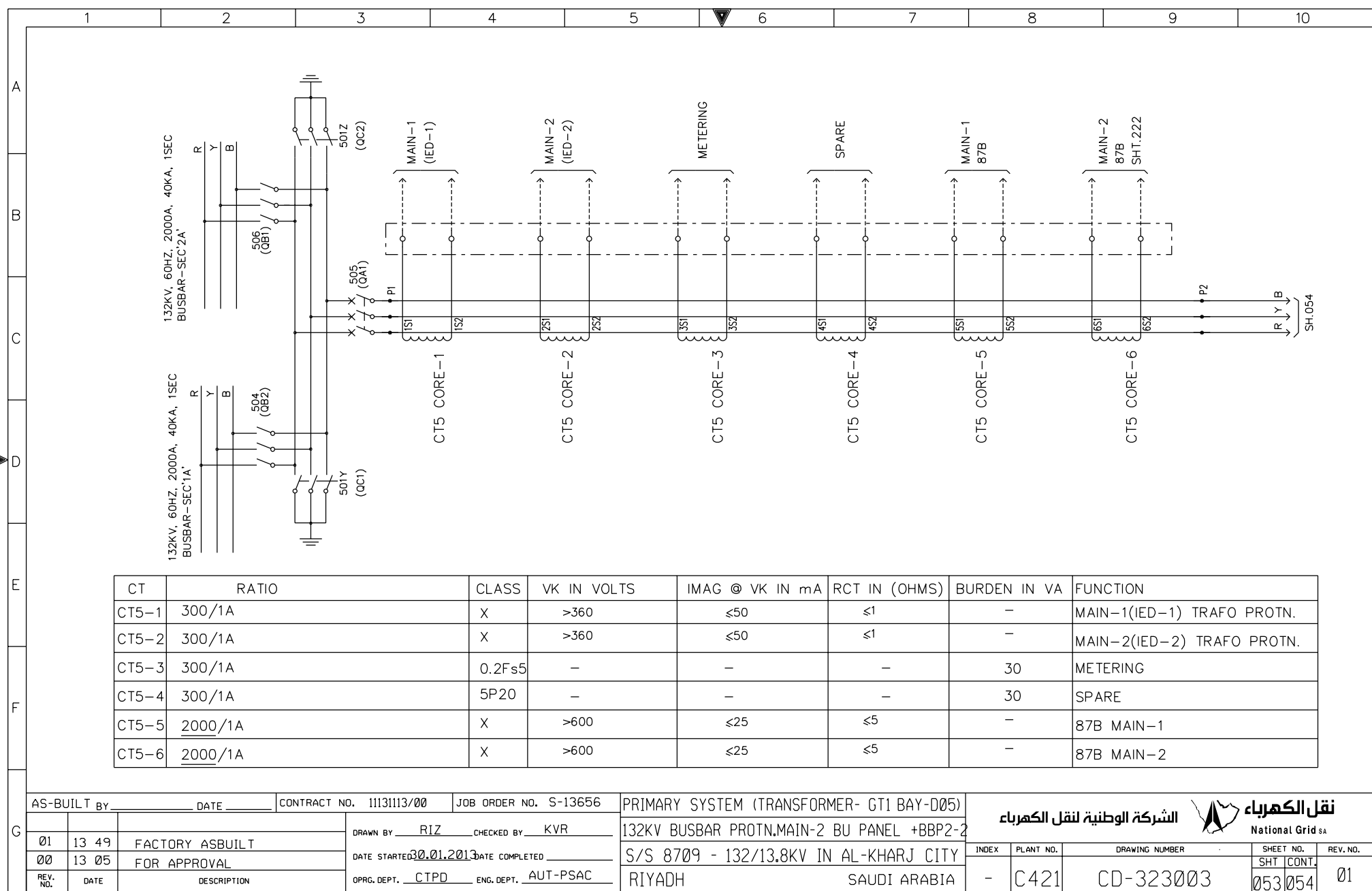
NGD200

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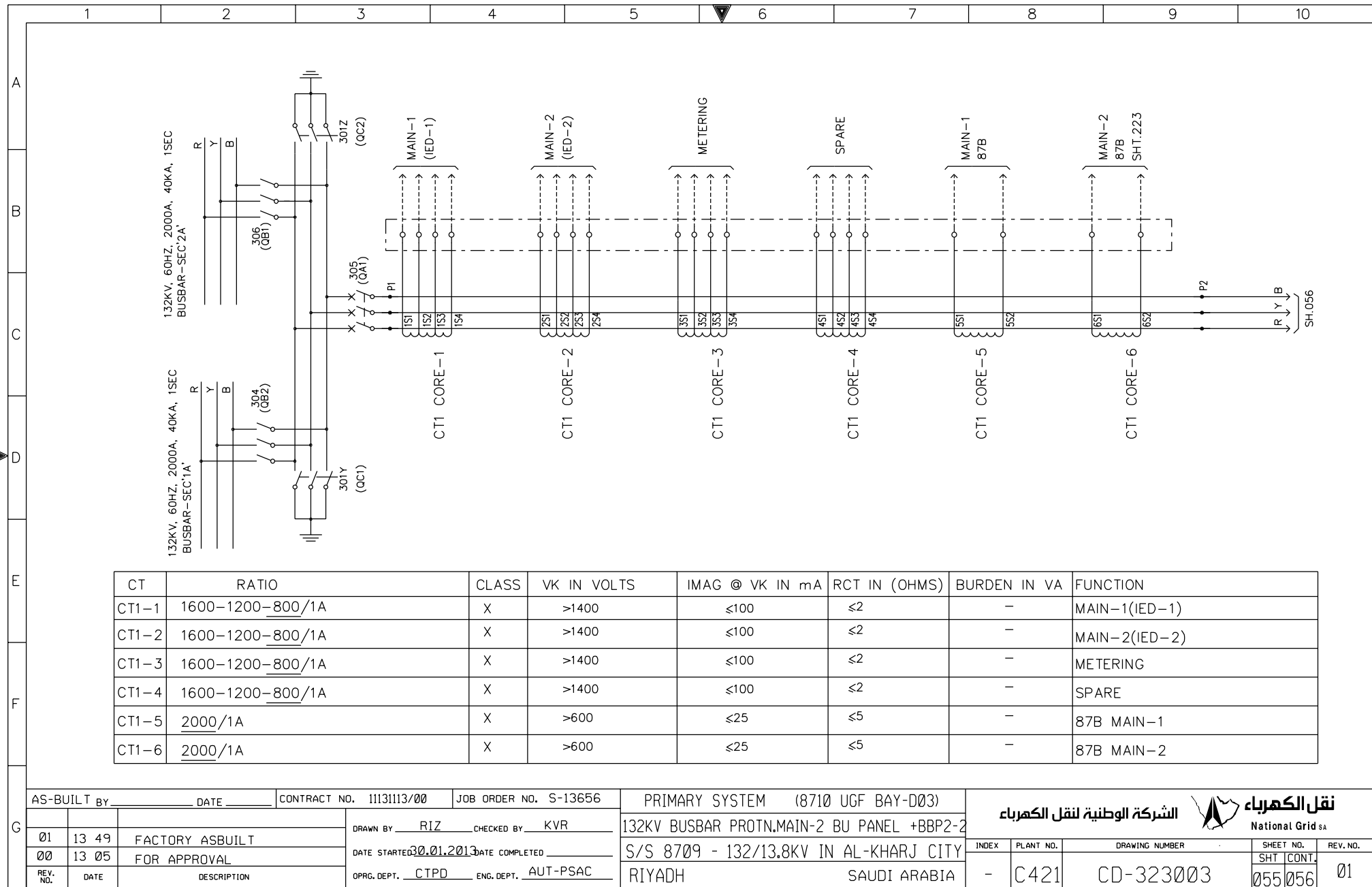




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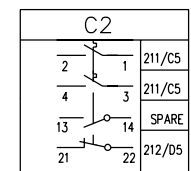
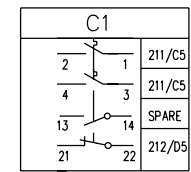
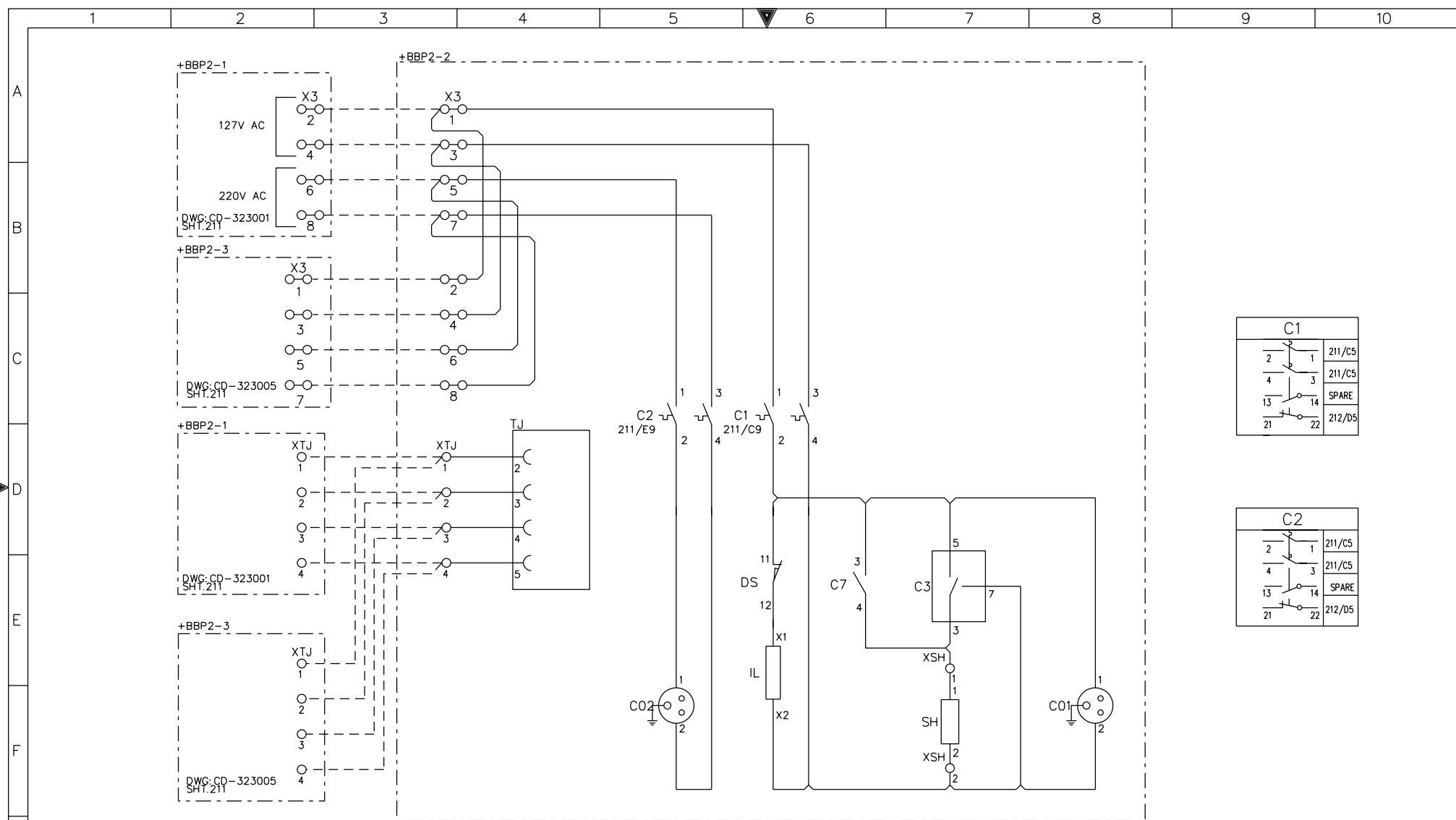






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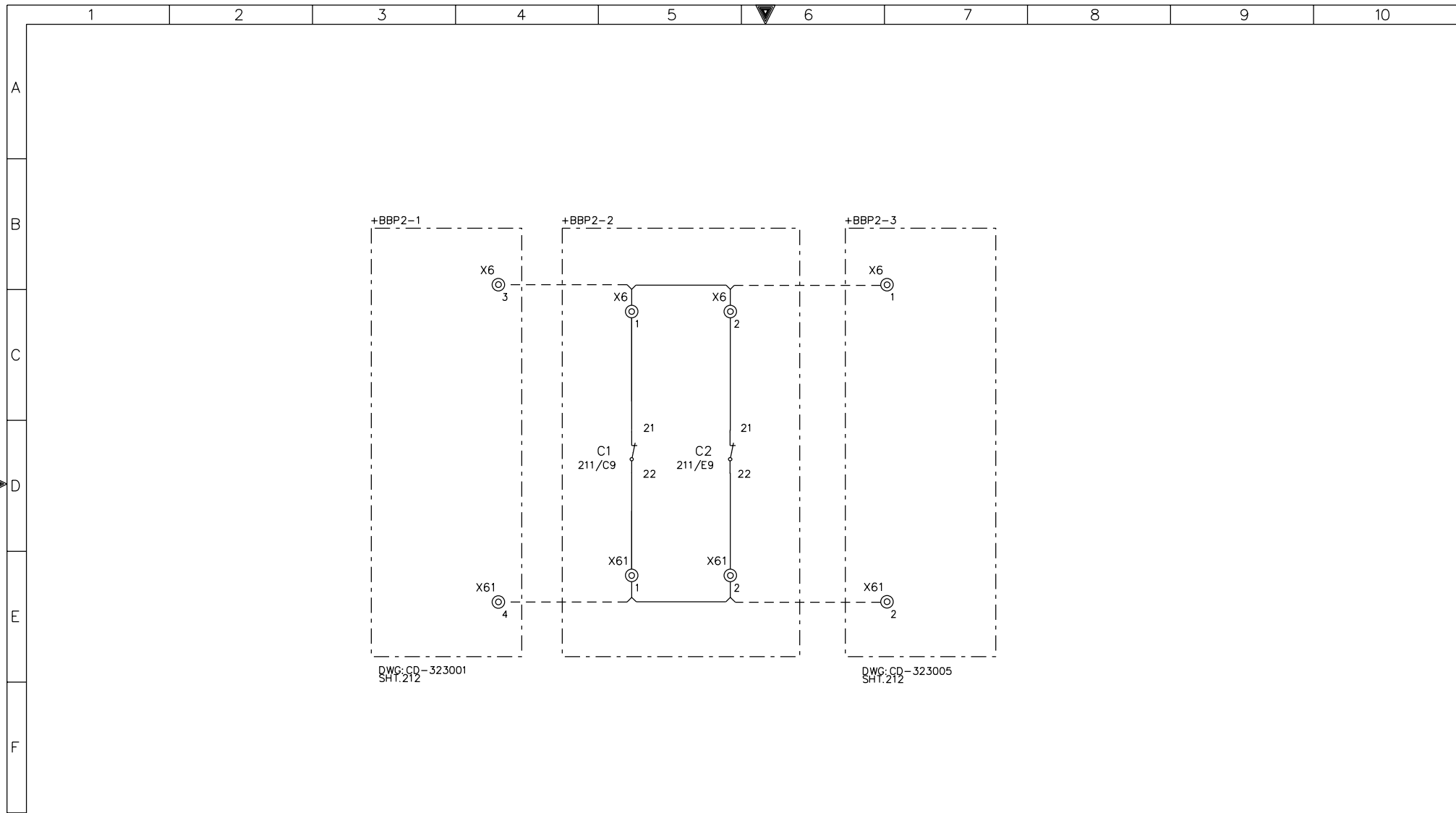




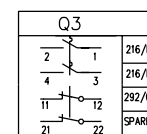
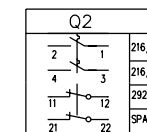
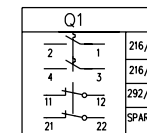
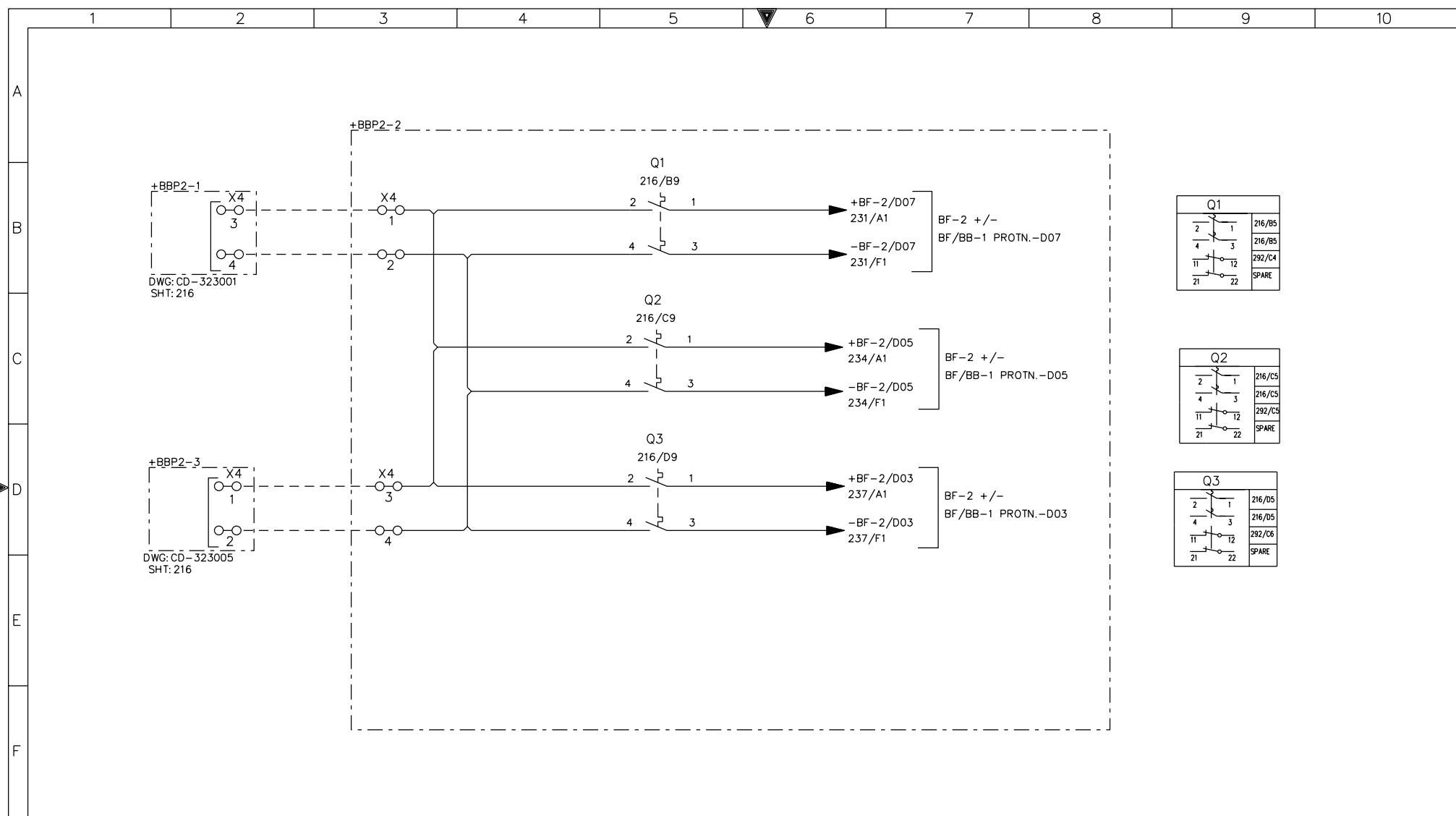
AS-BUILT BY _____ DATE _____			CONTRACT NO. 11131113/00		JOB ORDER NO. S-13656		AC SUPPLY FOR ILLUMINATION & POWER SOCKET		
01	13 49	FACTORY ASBUILT FOR APPROVAL	DRAWN BY RIZ		CHECKED BY KVR		132KV BUSBAR PROTN.MAIN-2 BU PANEL +BBP2-2		
00	13 05		DATE STARTED 30.01.2013		DATE COMPLETED _____		S/S 8709 - 132/13.8KV IN AL-KHARJ CITY		
REV. NO.	DATE	DESCRIPTION	OPRG. DEPT. CTPD		ENG. DEPT. AUT-PSAC		RIYADH SAUDI ARABIA		

الشركة الوطنية لنقل الكهرباء		نقل الكهرباء		National Grid sa	
INDEX	PLANT NO.	DRAWING NUMBER		SHEET NO.	REV. NO.
-	C421	CD-323003		211   212	01

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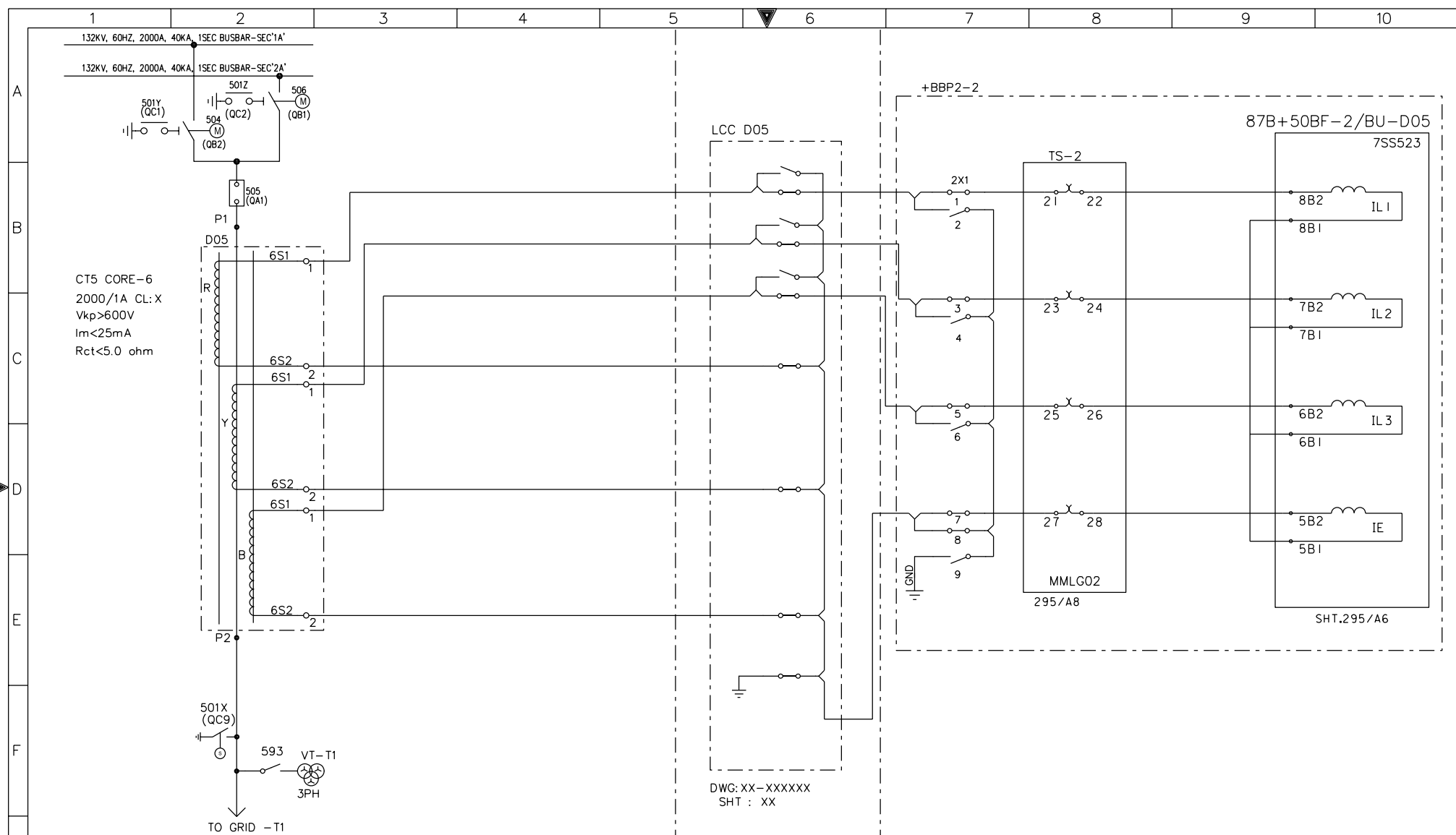


AS-BUILT BY _____ DATE _____			CONTRACT NO. 11131113/00		JOB ORDER NO. S-13656		CUB.LIGHTING,HEATER&SOKET ALARM CKT.			
01	13 49	FACTORY ASBUILT	DRAWN BY RIZ		CHECKED BY KVR		132KV BUSBAR PROTN.MAIN-2 BU PANEL +BBP2-2			
00	13 05	FOR APPROVAL	DATE STARTED 30.01.2013		DATE COMPLETED		S/S 8709 - 132/13.8KV IN AL-KHARJ CITY			
REV. NO.	DATE	DESCRIPTION	OPRG. DEPT. CTPD		ENG. DEPT. AUT-PSAC		INDEX	PLANT NO.	DRAWING NUMBER	SHEET NO.
							-	C421	CD-323003	SHT   CONT.
										212   216
										01



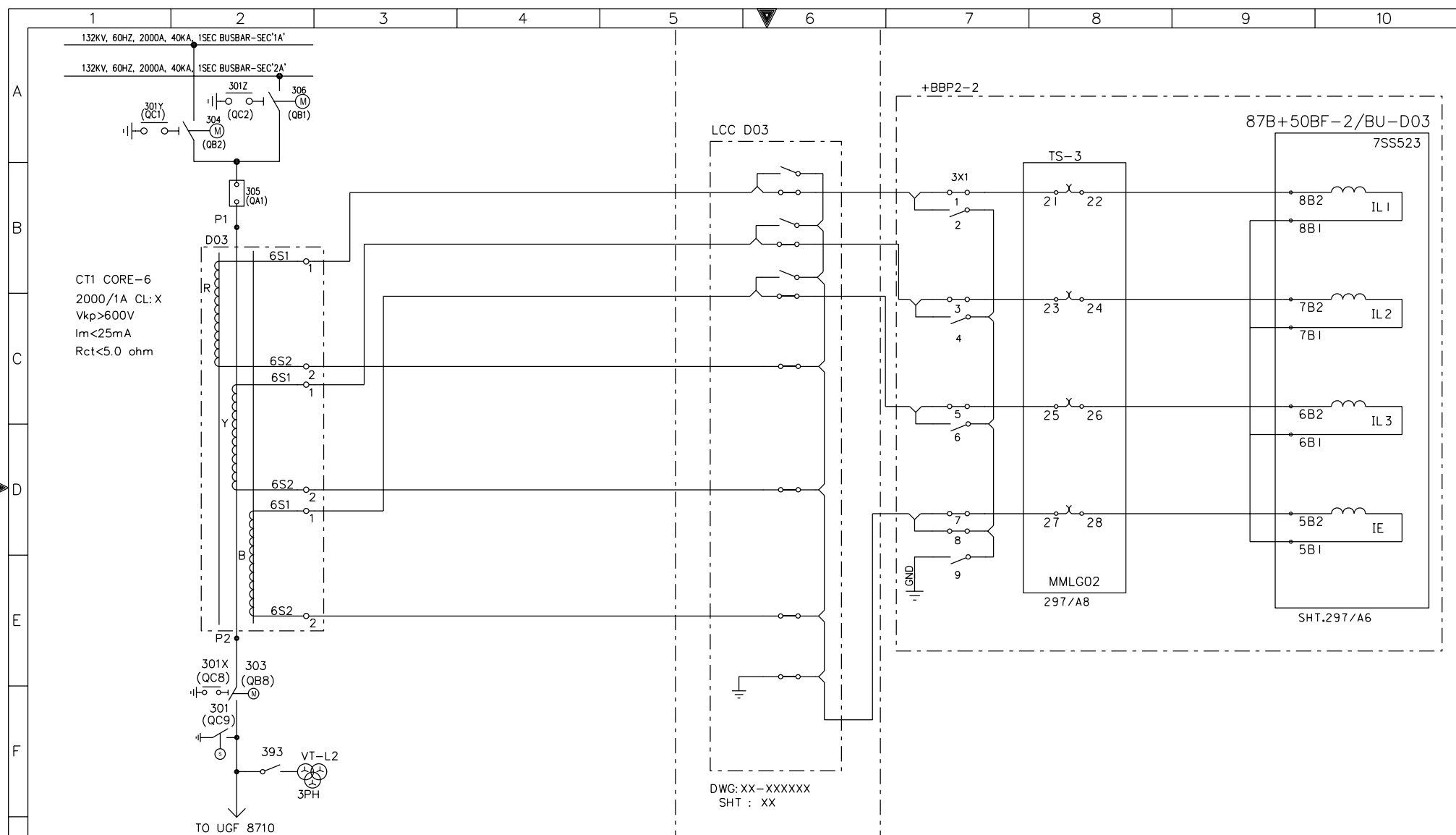
AS-BUILT BY _____ DATE _____			CONTRACT NO. 11131113/00		JOB ORDER NO. S-13656		DC SUPPLY DISTRIBUTION			الشركة الوطنية لنقل الكهرباء			National Grid sa	
01	13 49	FACTORY ASBUILT	DRAWN BY RIZ		CHECKED BY KVR		132KV BUSBAR PROTN.MAIN-2 BU PANEL +BBP2-2			INDEX	PLANT NO.	DRAWING NUMBER	SHEET NO.	REV. NO.
00	13 05	FOR APPROVAL	DATE STARTED 30.01.2013		DATE COMPLETED		S/S 8709 - 132/13.8KV IN AL-KHARJ CITY			-	C421	CD-323003	216   221	01
REV. NO.	DATE	DESCRIPTION	OPRG. DEPT. CTPD		ENG. DEPT. AUT-PSAC		RIYADH SAUDI ARABIA							





AS-BUILT BY _____ DATE _____		CONTRACT NO. 11131113/00	JOB ORDER NO. S-13656	CURRENT TRANSFORMER INPUTS -87B+50BF-2/BU-D05	<div> <div>الشركة الوطنية لنقل الكهرباء</div> <div>نقل الكهرباء</div> <div>National Grid SA</div> </div>				
01	13 49	FACTORY ASBUILT	DRAWN BY RIZ CHECKED BY KVR	132KV BUSBAR PROTN,MAIN-2 BU PANEL +BBP2-2	INDEX	PLANT NO.	DRAWING NUMBER	SHEET NO.	REV. NO.
00	13 05	FOR APPROVAL	DATE STARTED 30.01.2013 DATE COMPLETED	S/S 8709 - 132/13.8KV IN AL-KHARJ CITY	-	C421	CD-323003	SHT  CONT	01
REV. NO.	DATE	DESCRIPTION	OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC	RIYADH SAUDI ARABIA	<div> <div>NG/D2-D (2012/01)</div> <div>DMS VECTOR NGD200</div> </div>				

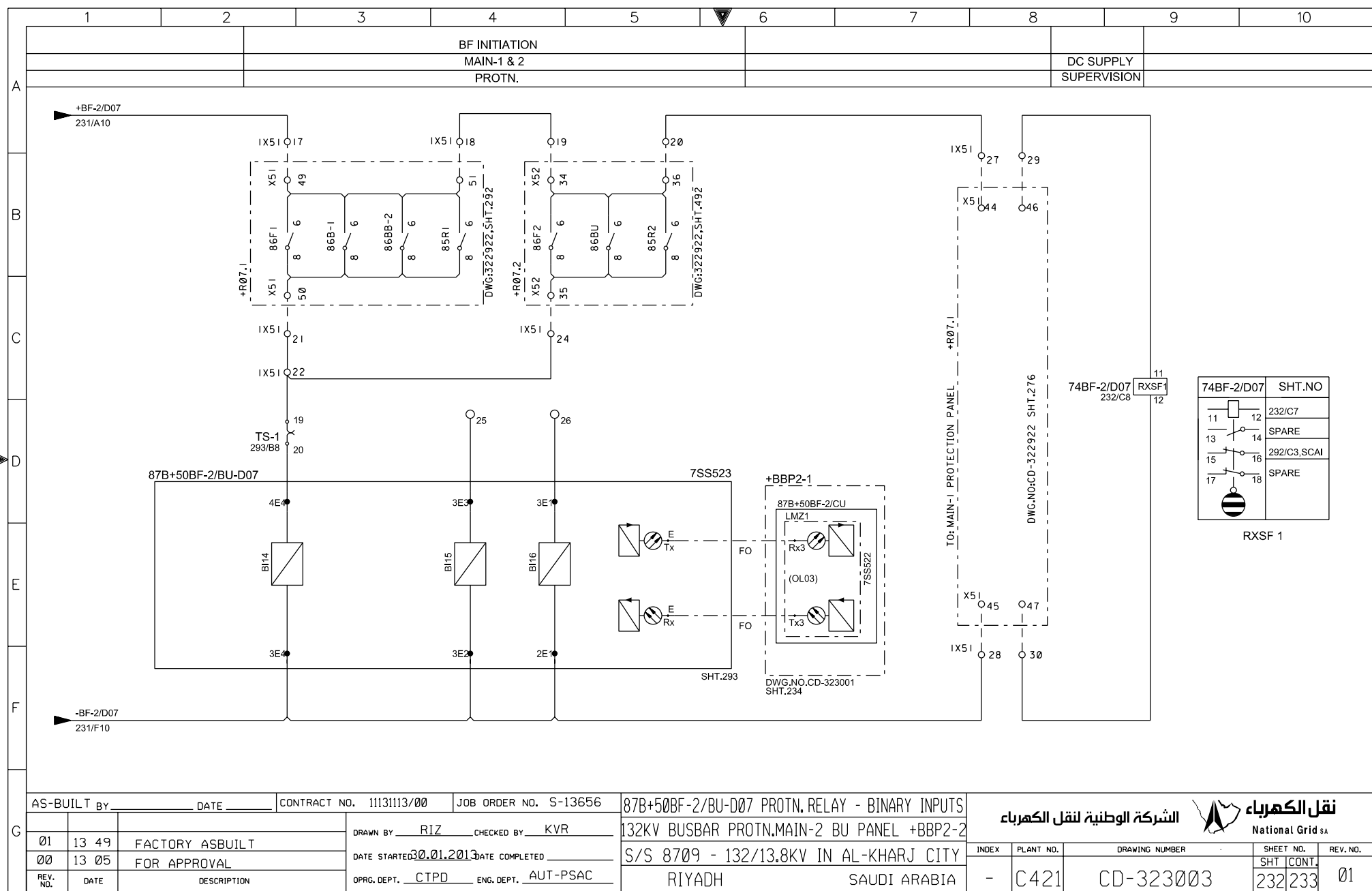
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AS-BUILT BY _____ DATE _____		CONTRACT NO. 11131113/00	JOB ORDER NO. S-13656	CURRENT TRANSFORMER INPUTS -87B+50BF-2/BU-D03	<div> <div>الشركة الوطنية لنقل الكهرباء</div> <div> </div> </div>			
01	13 49	FACTORY ASBUILT	DRAWN BY RIZ CHECKED BY KVR	132KV BUSBAR PROTN.MAIN-2 BU PANEL +BBP2-2				
00	13 05	FOR APPROVAL	DATE STARTED 30.01.2013 DATE COMPLETED _____	S/S 8709 - 132/13.8KV IN AL-KHARJ CITY	INDEX	PLANT NO.	DRAWING NUMBER	SHEET NO.
REV. NO.	DATE	DESCRIPTION	OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC	RIYADH SAUDI ARABIA	-	C421	CD-323003	SHT   CONT.
								223   231
								01







74BF-2/D07	SHT.NO
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13	292/C3,SCAI
14	SPARE
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16	
17	
18	

RXSF 1

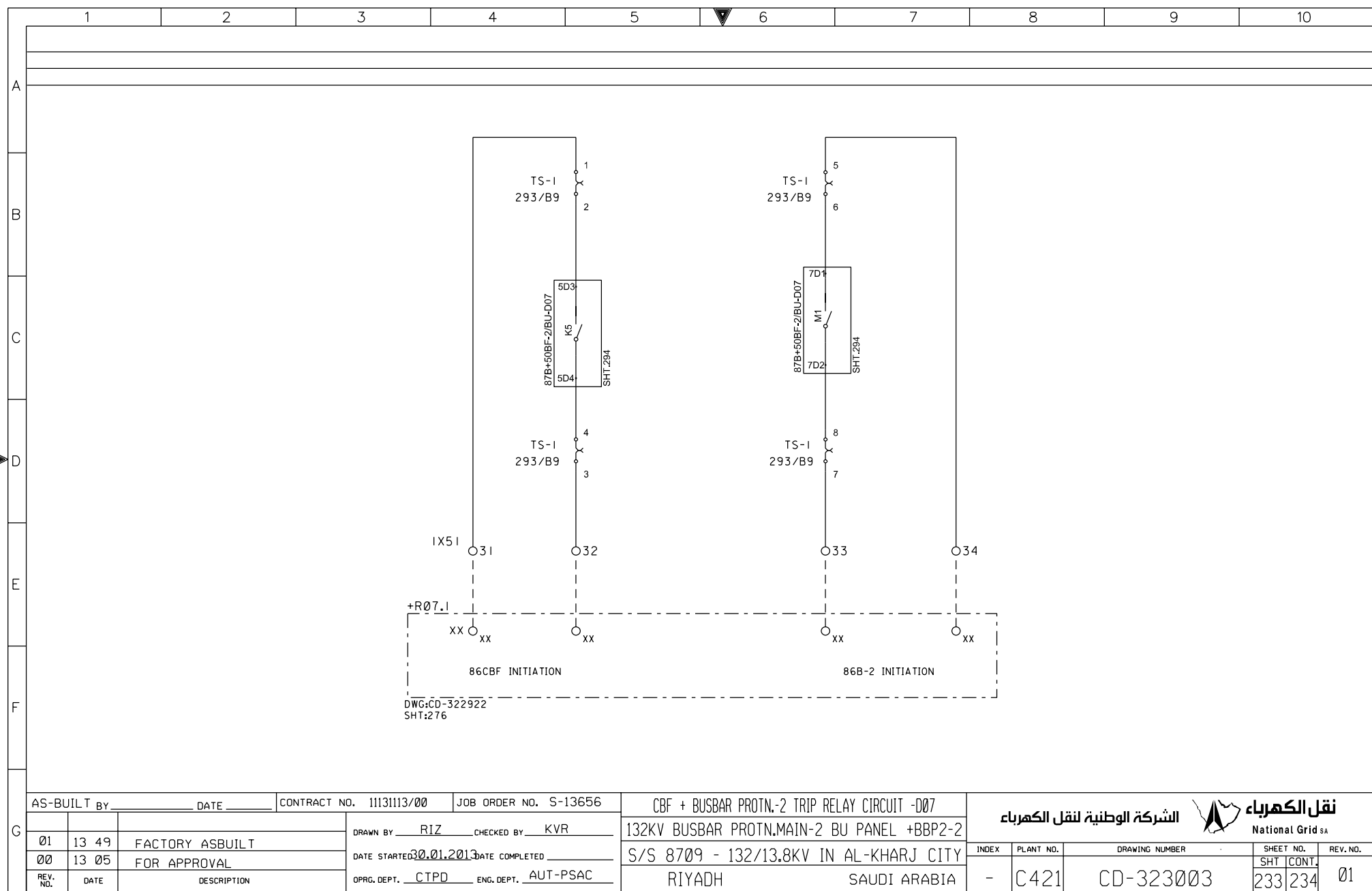


الشركة الوطنية لنقل الكهرباء

National Grid SA

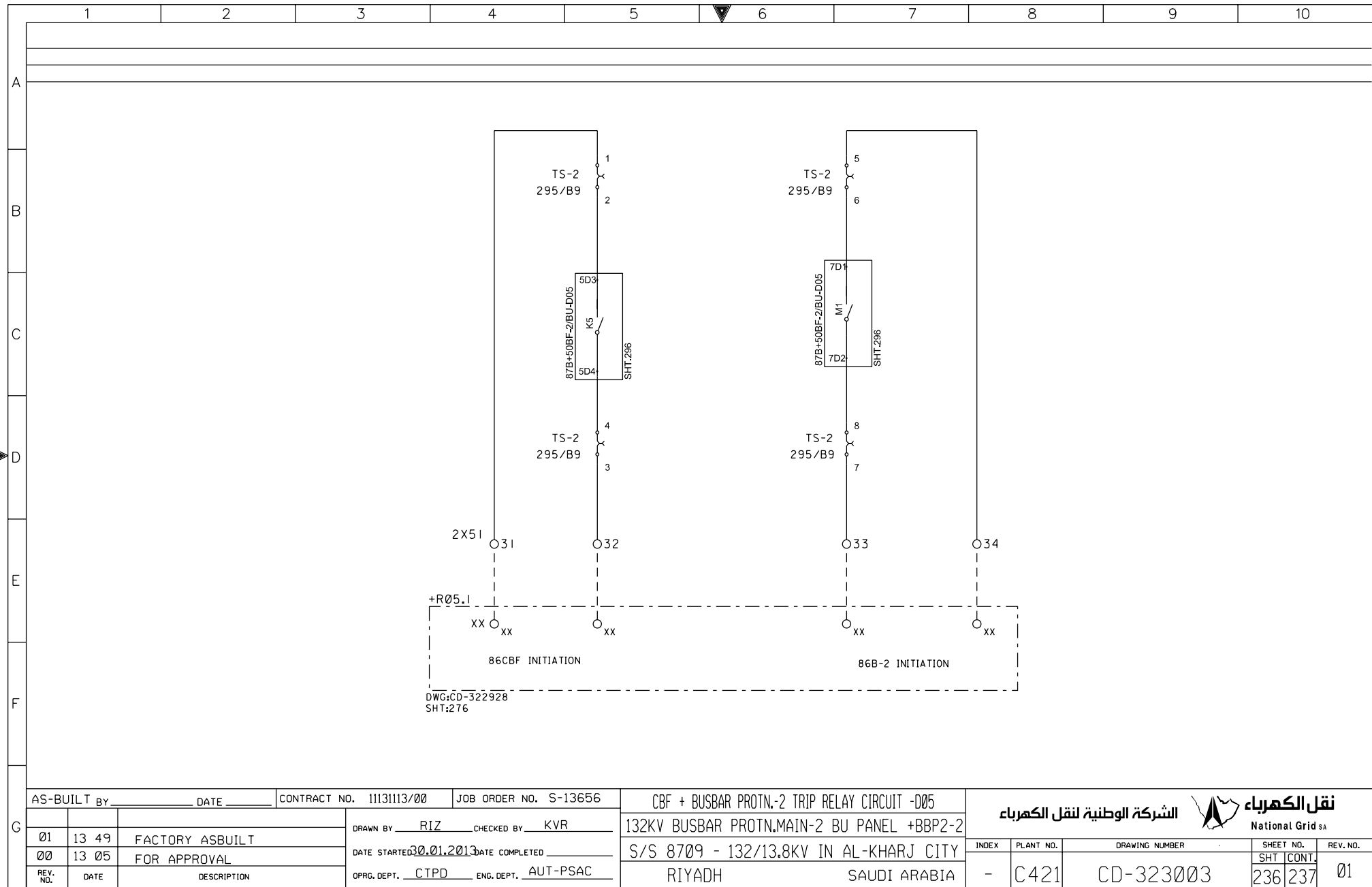
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NG/D2-D (2012/01)  
DMS VECTOR NGD200

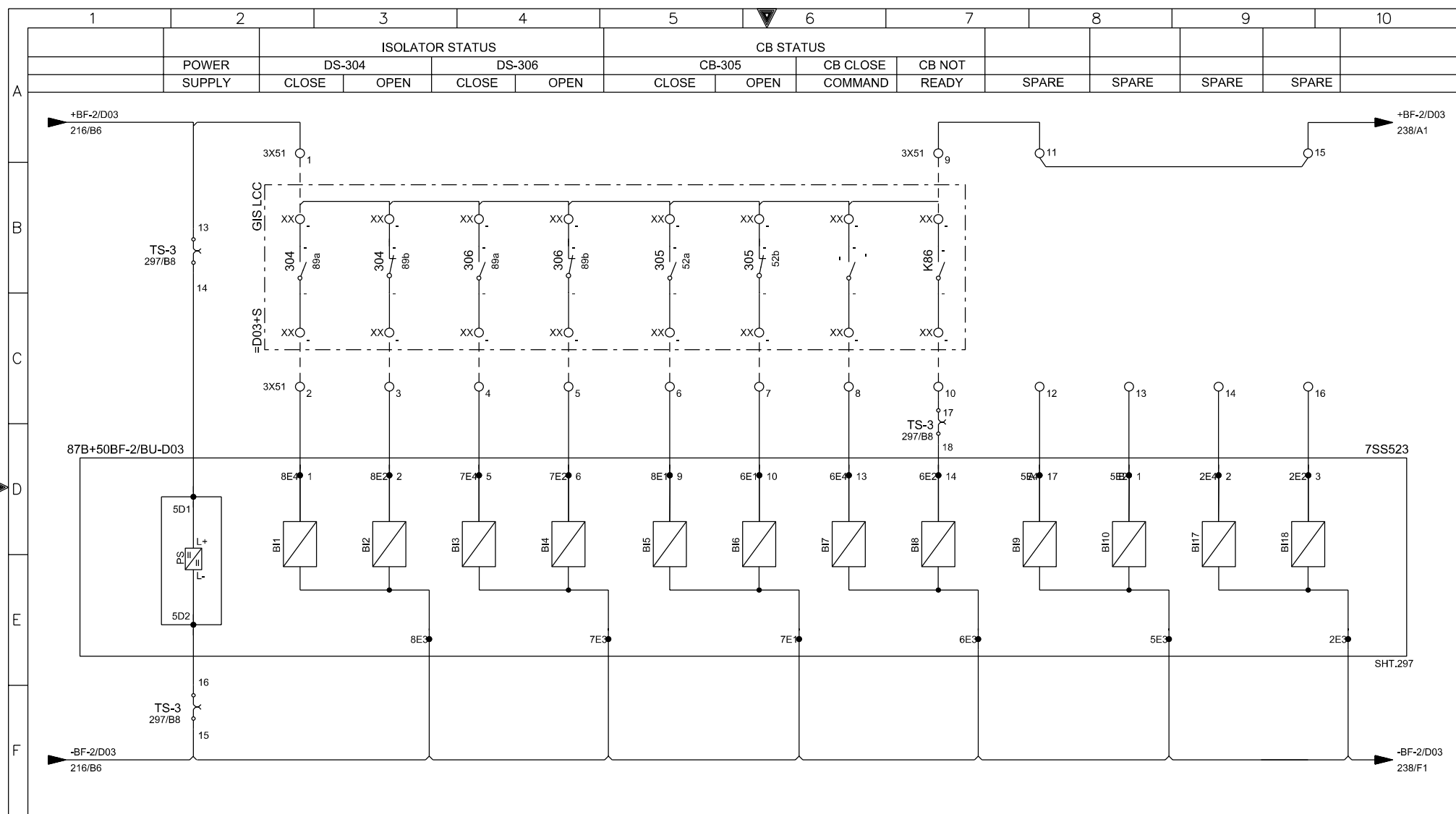








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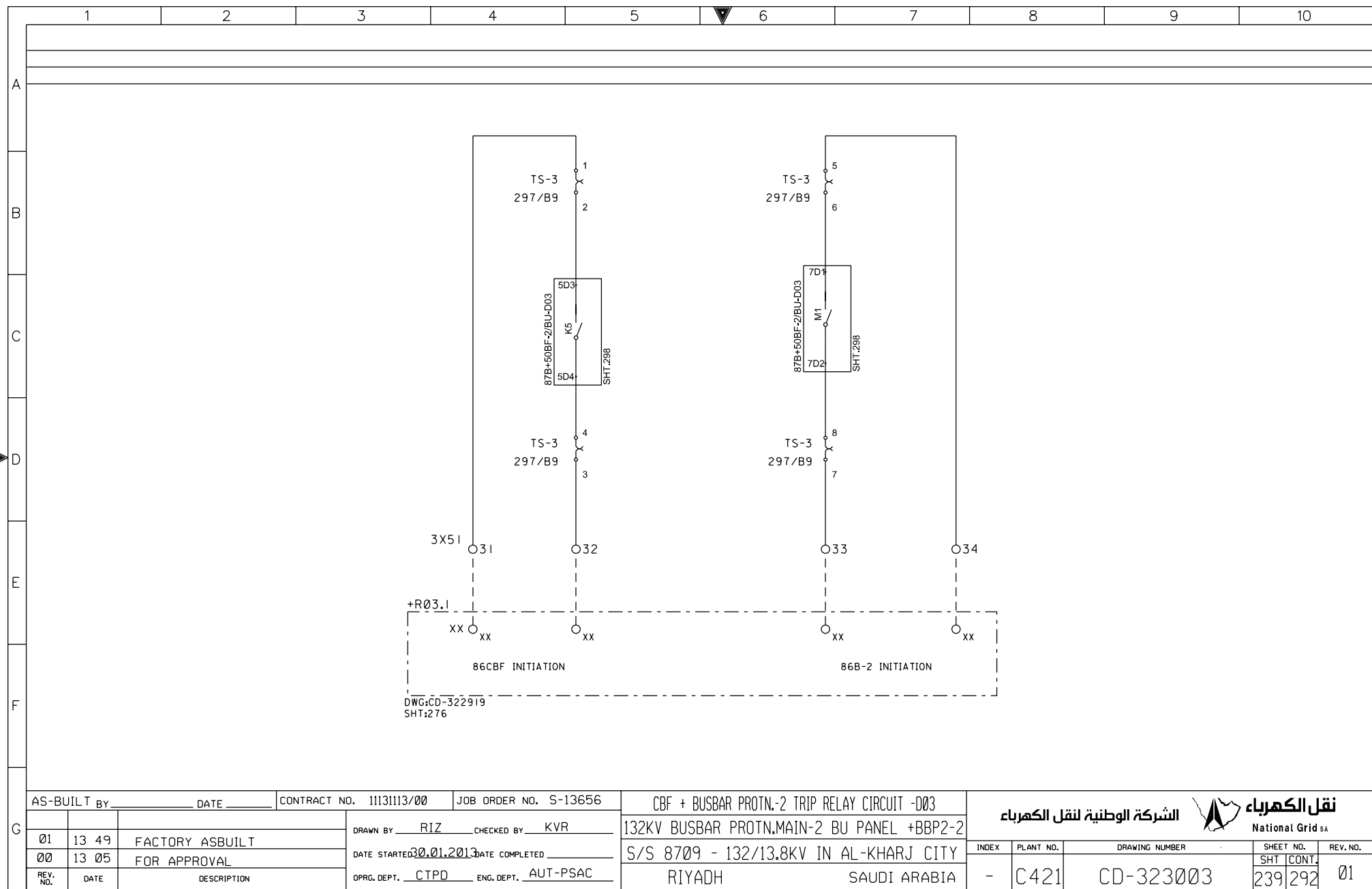


AS-BUILT BY _____ DATE _____		CONTRACT NO. 1113113/00		JOB ORDER NO. S-13656		87B+50BF-2/BU-D03 PROTN.RELAY - BINARY INPUTS		<div style="text-align: right;"> <b>نقل الكهرباء</b>  National Grid sa </div>	
01	13 49	FACTORY ASBUILT		DRAWN BY RIZ CHECKED BY KVR		132KV BUSBAR PROTN.MAIN-2 BU PANEL +BBP2-2			
00	13 05	FOR APPROVAL		DATE STARTED 30.01.2013 DATE COMPLETED _____		S/S 8709 - 132/13.8KV IN AL-KHARJ CITY		INDEX	PLANT NO.
REV. NO.	DATE	DESCRIPTION		OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC		RIYADH SAUDI ARABIA		DRAWING NUMBER	SHEET NO.
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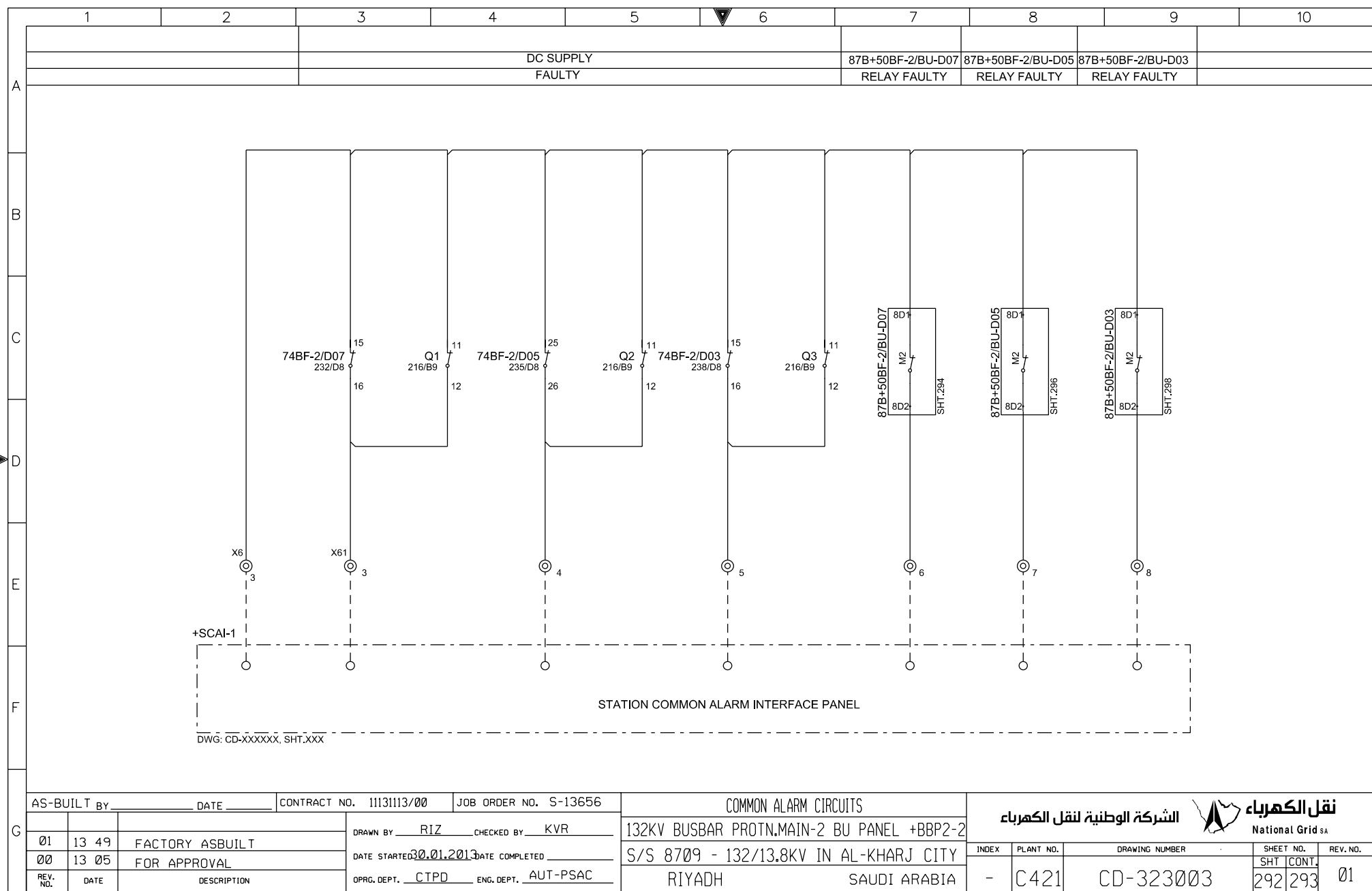
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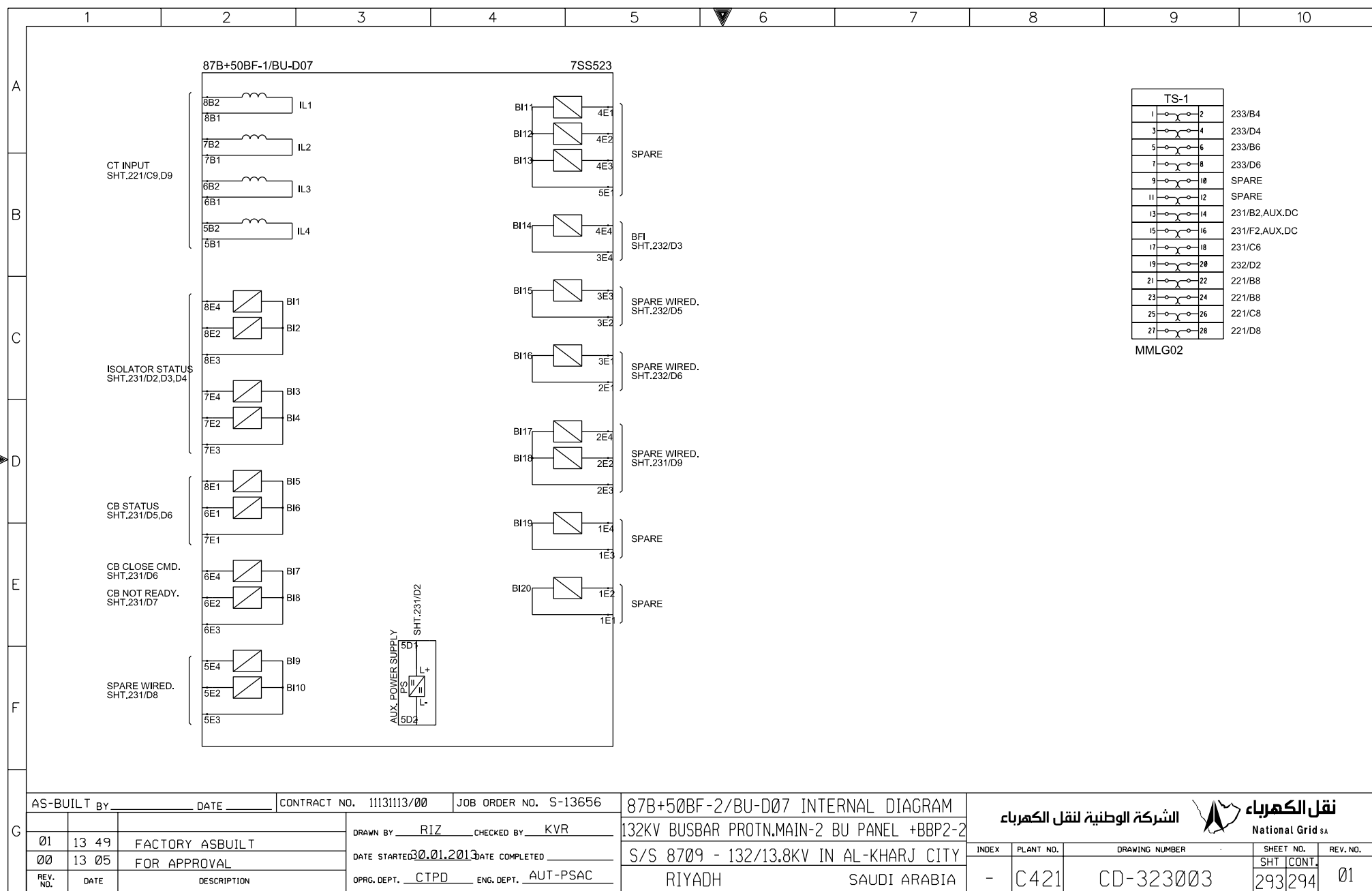






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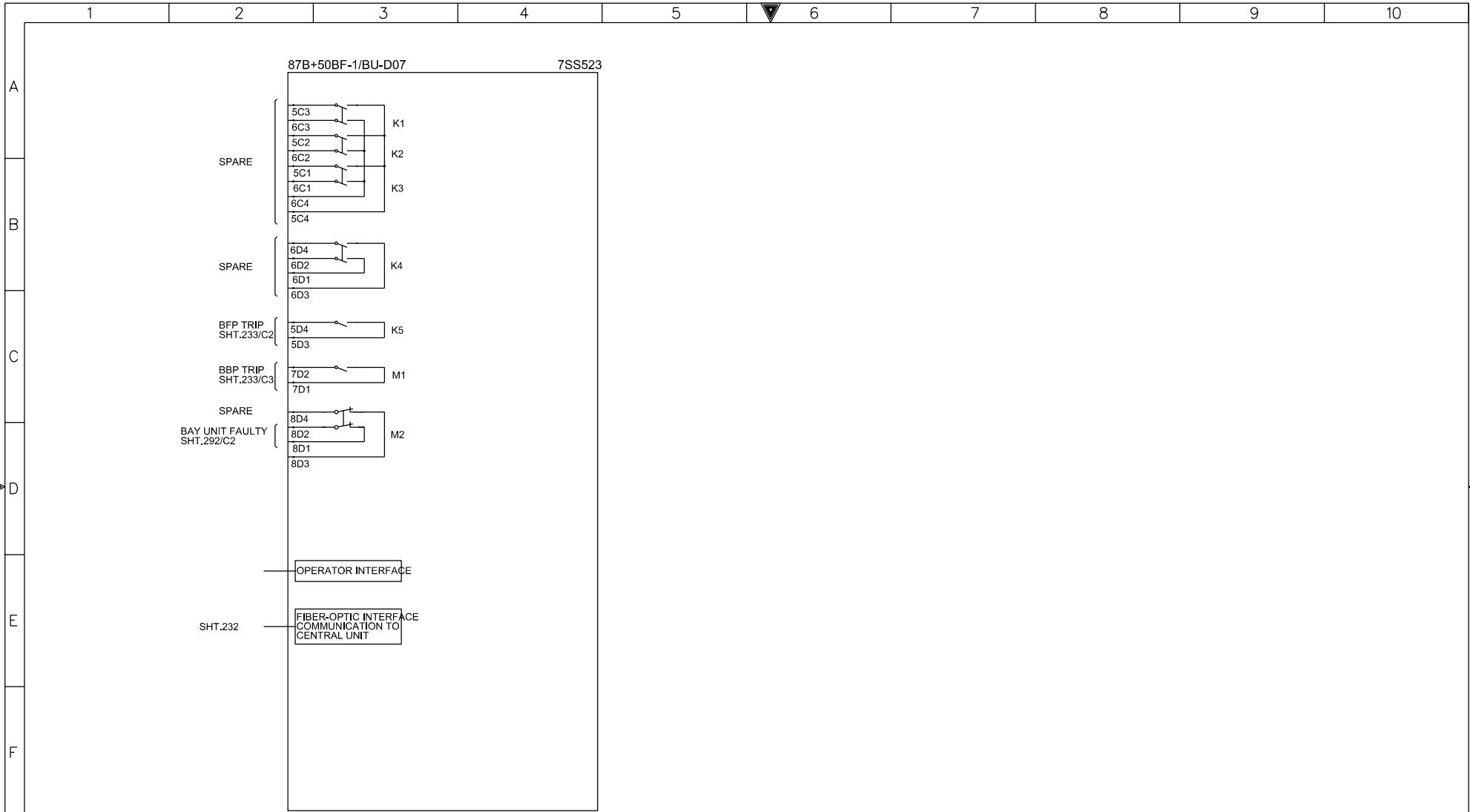




TS-1	
1	2
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23	24
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27	28

233/B4  
233/D4  
233/B6  
233/D6  
SPARE  
SPARE  
231/B2,AUX,DC  
231/F2,AUX,DC  
231/C6  
232/D2  
221/B8  
221/C8  
221/D8

MMLG02




G

AS-BUILT BY _____ DATE _____			CONTRACT NO. 11131113/00		JOB ORDER NO. S-13656	
01	13 49	FACTORY ASBUILT	DRAWN BY RIZ CHECKED BY KVR			
00	13 05	FOR APPROVAL	DATE STARTED 30.01.2013 DATE COMPLETED _____			
REV. NO.	DATE	DESCRIPTION	OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC			

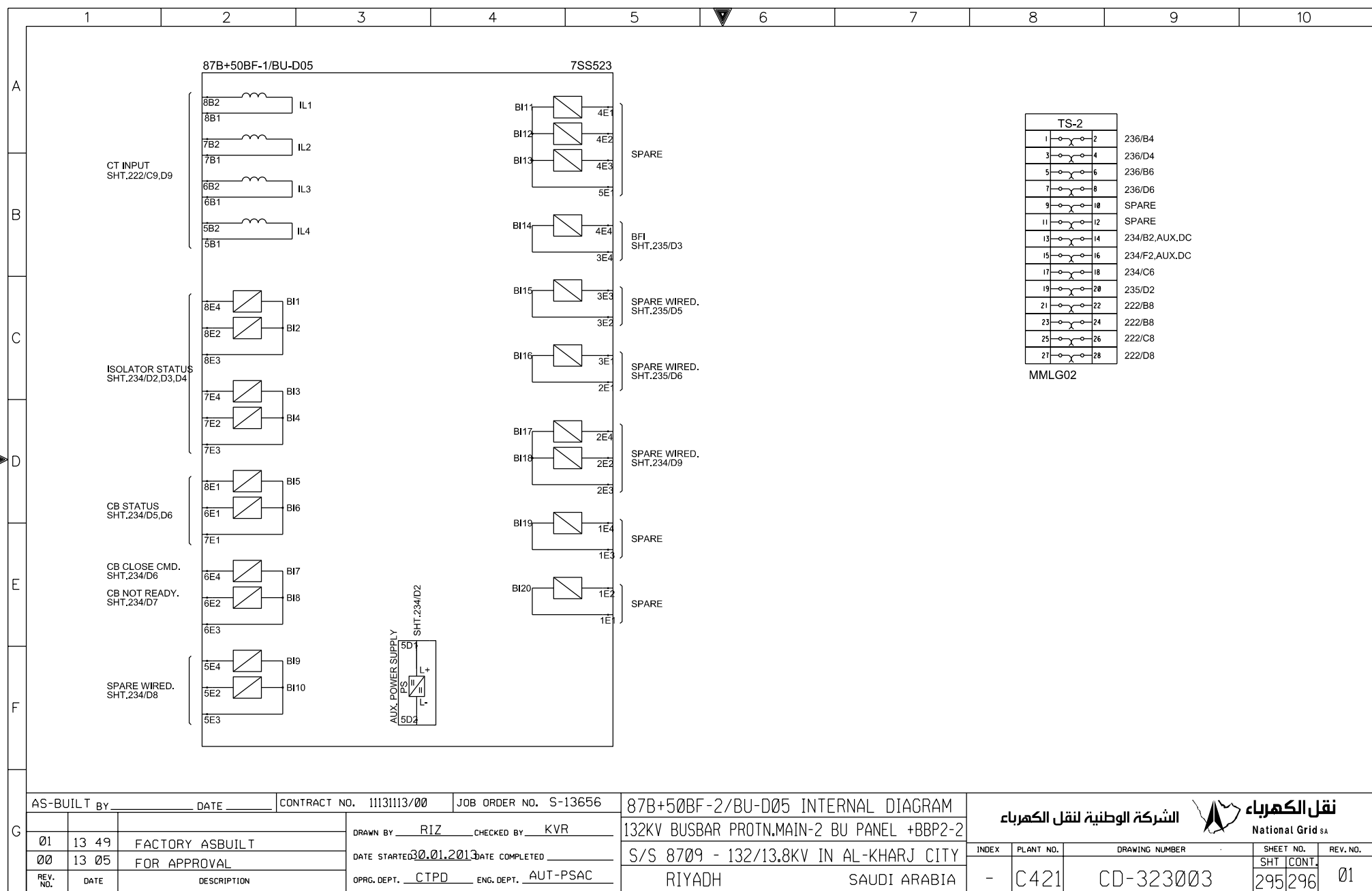
87B+50BF-2/BU-D07 INTERNAL DIAGRAM					
132KV BUSBAR PROTN.MAIN-2 BU PANEL +BBP2-2					
S/S 8709 - 132/13.8KV IN AL-KHARJ CITY					
RIYADH			SAUDI ARABIA		

الشركة الوطنية لنقل الكهرباء



National Grid SA

INDEX	PLANT NO.	DRAWING NUMBER	SHEET NO.	REV. NO.
			SHT  CONT.	
-	C421	CD-323003	294 295	01



AS-BUILT BY \_\_\_\_\_ DATE \_\_\_\_\_

CONTRACT NO. 11131113/00

JOB ORDER NO. S-13656

87B+50BF-2/BU-D05 INTERNAL DIAGRAM

132KV BUSBAR PROTN.MAIN-2 BU PANEL +BBP2-2

S/S 8709 - 132/13.8KV IN AL-KHARJ CITY

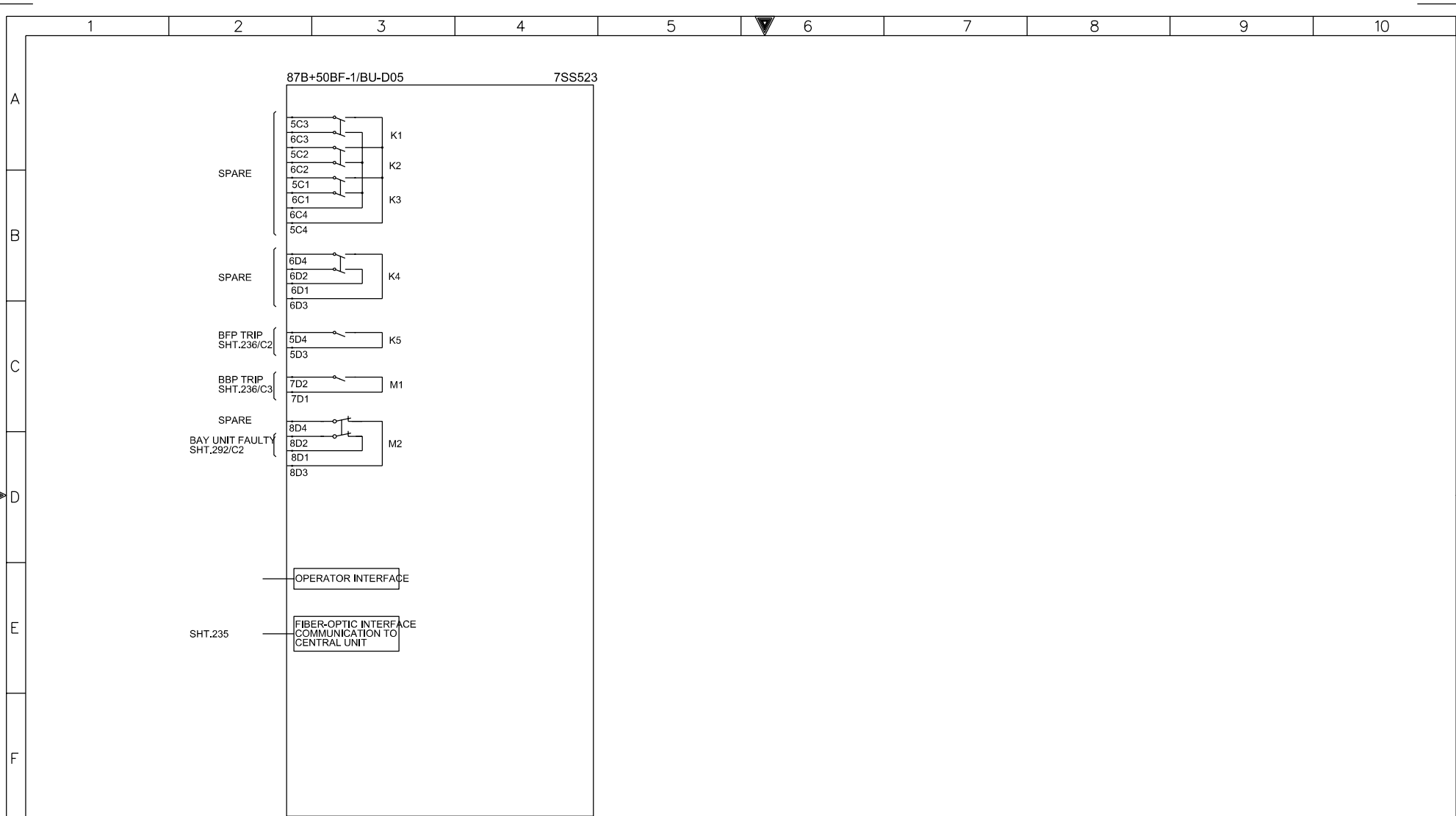
RIYADH SAUDI ARABIA

الشركة الوطنية لنقل الكهرباء

National Grid sa

INDEX	PLANT NO.	DRAWING NUMBER	SHEET NO.	REV. NO.
-	C421	CD-323003	295/296	01

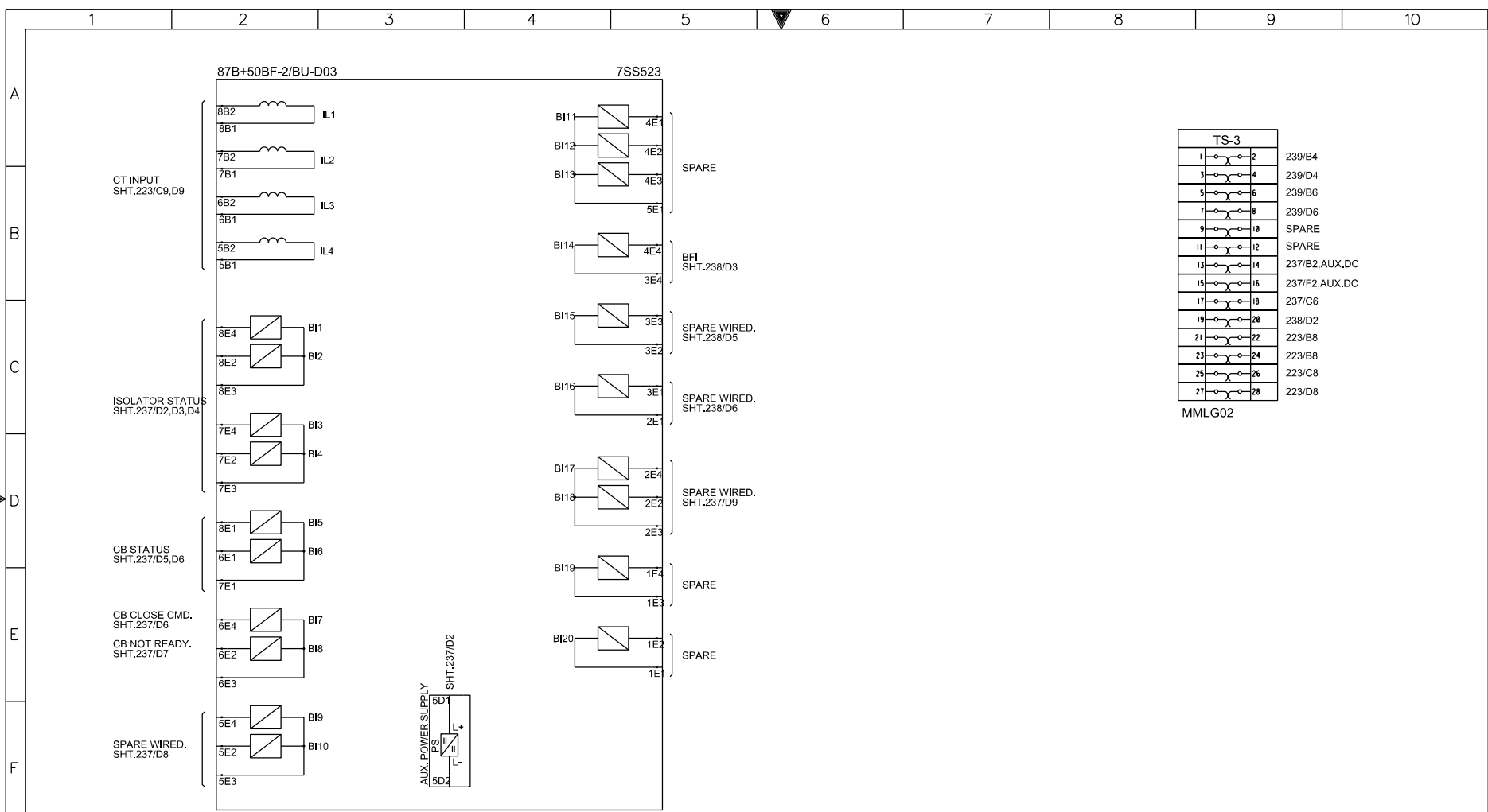
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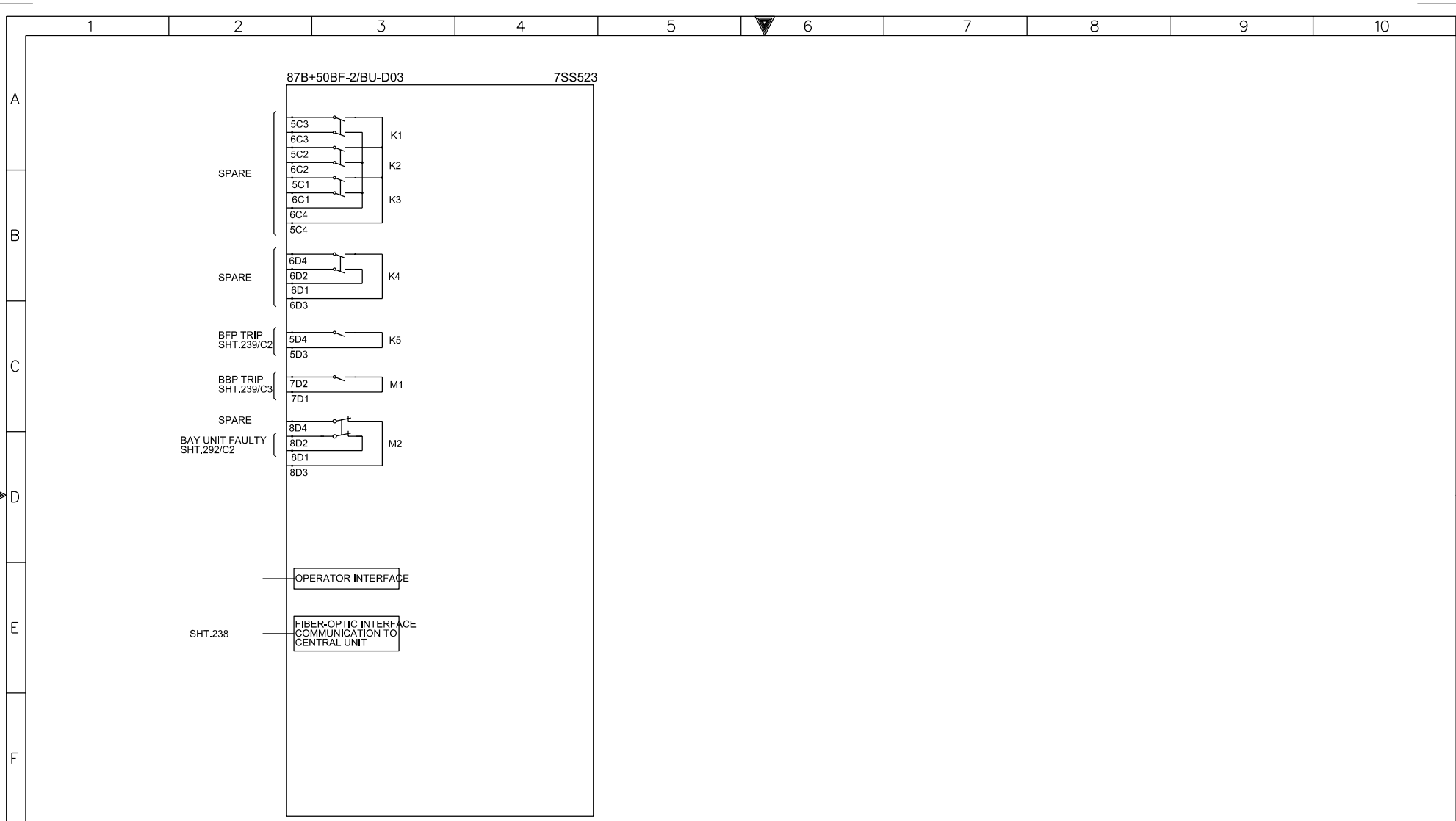
AS-BUILT BY _____ DATE _____			CONTRACT NO. 11131113/00		JOB ORDER NO. S-13656		87B+50BF-2/BU-D05 INTERNAL DIAGRAM				<div>الشركة الوطنية لنقل الكهرباء</div> <div>National Grid SA</div>			
01		13 49	FACTORY ASBUILT		DRAWN BY RIZ		CHECKED BY KVR		132KV BUSBAR PROTN.MAIN-2 BU PANEL +BBP2-2					
00		13 05	FOR APPROVAL		DATE STARTED 30.01.2013		DATE COMPLETED _____		S/S 8709 - 132/13.8KV IN AL-KHARJ CITY					
REV. NO.		DATE		DESCRIPTION		OPRG. DEPT. CTPD		ENG. DEPT. AUT-PSAC		RIYADH SAUDI ARABIA				

INDEX	PLANT NO.	DRAWING NUMBER	SHEET NO.	REV. NO.
-	C421	CD-323003	SHT   CONT. 236   297	01



AS-BUILT BY _____ DATE _____			CONTRACT NO. 1113113/00		JOB ORDER NO. S-13656		87B+50BF-2/BU-D03 INTERNAL DIAGRAM			الشركة الوطنية لنقل الكهرباء		
01	13 49	FACTORY ASBUILT	DRAWN BY RIZ		CHECKED BY KVR		132KV BUSBAR PROTN.MAIN-2 BU PANEL +BBP2-2			National Grid SA		
00	13 05	FOR APPROVAL	DATE STARTED 30.01.2013		DATE COMPLETED _____		S/S 8709 - 132/13.8KV IN AL-KHARJ CITY			INDEX PLANT NO. DRAWING NUMBER		
REV. NO.	DATE	DESCRIPTION	OPRG. DEPT. CTPD		ENG. DEPT. AUT-PSAC		RIYADH SAUDI ARABIA			SHEET NO. REV. NO.		
										SHT CONT. 297/298		

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AS-BUILT BY _____ DATE _____			CONTRACT NO. 11131113/00		JOB ORDER NO. S-13656		87B+50BF-2/BU-D03 INTERNAL DIAGRAM				<div>الشركة الوطنية لنقل الكهرباء</div> <div>نقل الكهرباء National Grid SA</div>			
			DRAWN BY <u>RIZ</u> CHECKED BY <u>KVR</u>			132KV BUSBAR PROTN.MAIN-2 BU PANEL +BBP2-2								
01 13 49 FACTORY ASBUILT			DATE STARTED <u>30.01.2013</u> DATE COMPLETED _____			S/S 8709 - 132/13.8KV IN AL-KHARJ CITY								
00 13 05 FOR APPROVAL			OPRG. DEPT. <u>CTPD</u> ENG. DEPT. <u>AUT-PSAC</u>			RIYADH SAUDI ARABIA				INDEX PLANT NO. DRAWING NUMBER		SHEET NO. SHT CONT.		REV. NO.
REV. NO. DATE DESCRIPTION										- C421 CD-323003		298301		01



